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Index to Advertisers—Page xl.

Principal Contents:

	PAGE
New Public Baths	107
Instrument Transformers. By A. Hobson	110
Industrial Heating. By E. M. Ackery	111
Soil Sterilisation. By F. C. Robinson	112
Lightning in Rural Areas. By T. C. Gilbert	113
The Distribution Proposals	114
High-voltage Distribution at Derby	115
Testing Tapes	117
Correspondence: Transformer Protection; The Absorption-type Refrigerator; Electricity Supply to Rural Areas	119
New Apparatus and Devices	120
British Overseas Electrical Trade	121
Business and Industrial Notes	122
Electricity Supply	126
Traction and Communications	128
Contract Information	129
Notes	130
Our Personal Column	131
Financial Section	132
Published Specifications	135
New Work for Contractors	136

Suspense

IT is probably just as well that the uncertainty which exists regarding future distribution policy should reach its present pronounced stage during the summer vacation. Whether the period of uncertainty will be short or long depends very much upon the attitude of the Government toward the proposals of the Minister of Transport and its desire to placate the very definite opposition that is finding expression from legitimately interested concerns or organisations which cannot be expected to show sympathy for changes which threaten to infringe their rights or sacrifice the interests of those whose investments have been made on the basis of reasonable security.

This is a matter quite distinct from the case of the small undertakings, which has already been fully stated on their behalf. The report prepared by a committee of the Association of British Chambers of Commerce, for the attention of the Minister of Transport, and the speech of the chairman of the Powell Duffryn Collieries, who are largely interested in electricity supply, both financially and as very large consumers, are given on a later page of this issue, and they merit study as part of the subject which is now before us as a people.

We also deal with another series of alternative proposals. Mr. C. F. Spencer, who was a member of the Williamson Committee on Electricity Supply which was set up during the War years, has joined with Mr. T. Mensforth in preparing a scheme by which, it is thought, the industry can work out its own salvation with the minimum of compulsion. It is a "two-year plan," which treats the Electricity Commissioners as a judicial body, leaving the preparation of schemes to National and District Committees.

While it is easily recognised that the situation is full of points of great and possibly unexpected complexity, which involve and demand most careful consideration before the terms of suggested legislation are drawn up, it is, nevertheless, becoming increasingly necessary if the best interests of the industry and of the nation are to be served that the approach to a decision should be expedited.

Though the demand for electricity for all purposes has been advancing at a most gratifying rate for some time past and there is little likelihood of the rate of progress falling off while industry is prosperous and the consumer is in funds, we may make a slower rate of development than would otherwise be the case if authorities, companies and municipalities alike do not know where they stand.

It is said that a brake has been put upon enterprise here and there, that those responsible for the preparation of extension plans are disinclined to go ahead, and that schemes for attracting new consumers may be deferred. To exactly what extent these things are happening it is impossible to say, but we hope that the determination to make greater headway will not be weakened beyond absolute justification.

There is, indeed, an observable tendency to speed matters up in some areas. Voluntary co-operation, which the McGowan Committee considered had proved impossible of achievement, is being canvassed by some of the smaller undertakings now that they are threatened with extinction. Maybe, if the Committee of Smaller Municipal Undertakings had the five-years' breathing-space which it recently proposed, a great part of the present muddle would be straightened out.

The market for electrical securities has been, unfortunately, affected by the recent threatening atmosphere, and one cannot but regret that a very popular class of investment, which has in recent years been regarded as gilt-edged, has been so adversely affected lately by fears concerning the future.

At a meeting of M.P.s this week Dr. Burgin, the Minister of Transport, promised that a Bill would be introduced in the autumn. While this Bill is going through its various stages the suspense will continue, but Dr. Burgin's statement seemed to imply that the Government intends to expedite its passage into law.

Ironmongers' Doubts

THE uncertainty of the future engendered by the reorganisation proposals is shared by the ironmongers. At a recent meeting of the Birmingham and Midland Ironmongers' Association the view was expressed that if the reorganisation meant taking supply out of the hands of local authorities it might provide the opportunity which the ironmongers had been waiting for. This rather optimistic idea was countered by Mr. E. B. Holloway, who was mainly responsible for the formation of the Electrical Section of the Ironmongers' Federated Association. He pointed out that what was more likely to happen was an intensification of apparatus sales by the supply authorities as reconstituted. He assured the first speaker that the Electrical Section was watching the matter closely. It is improbable, however, that this will influence the trend of events.

Marconi

IT is only fitting that the name of Marconi should be as intimately associated as it is with radio by the general public. It was Marconi who realised the possibilities of using electric waves for communication, and who was at the same time gifted with the practical genius required to co-ordinate what was known about them and to develop their application in the service of man. While we of the British Isles may take a just pride that he carried out so much of his work over here, where his activities met with every encouragement (his death occurred on the fortieth anniversary of the formation of Marconi's Wireless Telegraph Co., Ltd.), and that he was partly of Irish origin, there is more in it than that. Marconi's work was of a kind that transcends national boundaries in more than a figurative sense. By its very nature it should emphasise the essential importance of the common aims of the peoples. It will endure when differences between them are merely forgotten history.

Reinforcing Distribution

WITH the introduction of its 33-kV scheme, Derby Corporation has joined the ranks of those undertakings which have augmented their distribution resources by superimposing a higher-voltage system on the existing 6.6-kV network. Although in its early stages the method resembles that employed for simple transmission there is the difference that a high voltage will ultimately be necessary in congested areas, not so much on account of regulation over long distances, or even reduced losses, as on account of saving in space occupied by the cables. Even for quite short distances the supplying of heavy industrial loads elsewhere has already called for the use of higher voltages than those that might seem warranted on a superficially economic basis.

An Echo from Brighton

AT last month's I.M.E.A. Convention a Barnes alderman was deputed by his Council to move a resolution suggesting that these annual gatherings should be shortened and held in more convenient places. He duly carried out his instructions but complains that he was shouted down while doing so. The matter was discussed at length at last week's meeting of the Council, when it was decided to send a protest to the Association. It was contended at the meeting that too much time was often spent in travelling to remote resorts and too much more absorbed by purely social affairs. There are, of course, two views on each of these points. The holding of the conventions in attractive surroundings is more likely to ensure successful gatherings than the selection of towns in the heart of the Black Country. Again, many people, the majority probably, hold that the social side of these conferences is even more important than the business proceedings as it enables the delegates to "get together" and express their ideas with more freedom than is possible in a formal meeting where time is limited and considerations of "policy" prevail.

Gas on Electric Cookers

THE use of gas hot-plates (as gas rings now appear to be called) on electric cookers may be undesirable, and possibly unsafe, but it is not illegal. This was established when an action brought by the Egham and Staines Electricity Co. against the Gas Light and Coke Co. was dismissed by Mr. Justice Farwell on Monday last. The Electricity Company maintained that the Gas Company's action in inducing hirers of electric cookers to use gas hot-plates placed on the top of these appliances amounted to inducement to breach of contract, as the hiring agreement provided that no alteration or addition to the cookers should be made without the company's written consent. Two types of gas hot-plate were mentioned during the hearing. The earlier one was apparently attached in some way to the cooker, but the Gas Company had ceased to supply it; the later pattern merely rested on the top of the cooker. The Electricity Company maintained that the installation of these hot-plates was a breach of No. 25 of the Electricity Supply Regulations, which relates to the responsibility of a supply authority for the maintenance of a consumer's installation in a safe condition, but the opinions on the subject of safety were about balanced.

The Doctor's Surgery

IF any doctor can obtain a preferential quotation for the installation of gas appliances and a discount on his gas bill because the gas companies attach advertisement value to the presence of their class of service in the surgery, should not medical men who appreciate the basic advantages of electric heating have similar concessions made to them by electricity undertakings? This, in effect, is what is asked in some notes written by Mr. A. C. Cramb, E.D.A.'s Director, in a recent issue of the official "Bulletin" of his organisation. We feel, with him, that the question "merits investigation," though we recognise that gas companies may be able to do many things that others cannot.

Railways from the Air

AN official committee is considering the question of running a reduced railway service at night without signals in the event of an air raid. Colour-light signalling is said to be appreciably more distinct from an aeroplane than are older methods, although even oil lamps are visible. Arcing at the collector gear of electric trains can also be detected from above, but surely this applies in about equal measure to the furnace and smoke box of a steam locomotive. The real solution to the problem would appear to be the devising of a method of shrouding any arcing that takes place.

Anti-Gas Shelters

IN a recent lecture on anti-gas training, we are informed by a reader, the speaker stated that the use of an electric fire with open-type elements would be inadmissible in a sealed gas-proof room, as it would consume oxygen. This is, of course, incorrect, as an electric fire requires no oxygen to support combustion and the amount used in any oxidation of the heating elements would be inappreciable—otherwise they would have an exceedingly brief life. Such discomfort as would be felt from an electric fire would be caused by the undue drying of the air, especially if the temperature were very low initially. Probably a small air-conditioning unit would meet the case. The electric fan incorporated would also perform a very necessary service in imparting motion to the atmosphere, as more discomfort is caused by the air being still than could be occasioned by a fairly high proportion of CO_2. In calculating the capacity of an electric heater, allowance should be made for the number of persons likely to be present in a small gas-proof room, at the rate of 120W per person.

New Public Baths

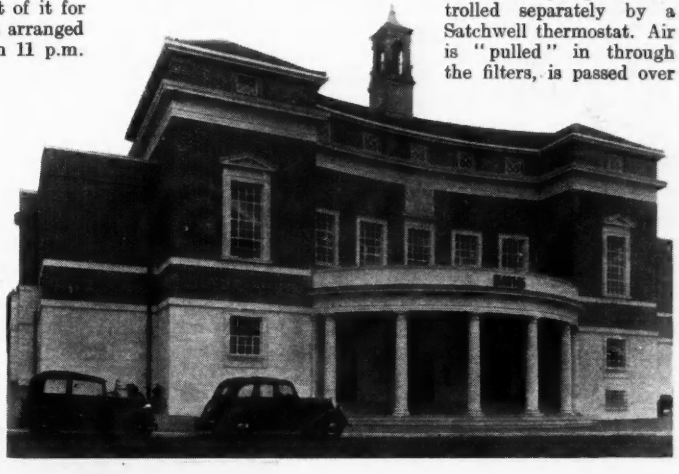
Particulars of electrical installations at Bournemouth and St. Marylebone

WE believe that the new Pier Approach baths of the Bournemouth Corporation represent the first installation in this country in which electricity is used actually for heating the hot rooms of turkish baths, but in any case the fact that electricity is used also for heating the swimming-pool water, for space heating and also for slipper-bath services makes the installation an outstanding one.

The building accommodates a 100 ft. by 35 ft. swimming pool, from 3 ft. to 12 ft. deep, and on the first and second floors are extensive suites of slipper baths, these floors being served by an Express lift. On a mezzanine floor between the ground and first floors an amphitheatre provides accommodation for 600 spectators above the swimming pool. A bathers' terrace on the south side of the pool is about 90 ft. long.

Supply is taken at 11,000 V from the mains of Bournemouth Corporation electricity undertaking, and part of it for the swimming-pool services and the turkish baths is arranged on an off-peak load system with supply hours from 11 p.m. to 8 a.m. and from noon to 2 p.m. The off-peak load transformer and one for other power and lighting services are supplied from a common e.h.v. switchboard with duplicate feeds. From the off-peak load transformer a Reyrolle 400-V switchboard supplies an electrode boiler *via* an oil circuit-breaker, and the turkish bath services and also the control panel for the boiler are supplied through ironclad switch-fuse units on the same board.

A separate transformer serves the lighting and other power through a switchboard composed of G.E.C. switch-fuse units mounted on slotted angle steel. This construction permits any size and shape of switch and fuse unit to be catered for and facilitates extensions to the board.



[*Elec. Rev.* photos

Above: The handsome façade of the Pier Approach baths, Bournemouth. Left: The new baths at St. Marylebone

A 900-kW electrode boiler supplied by Bastian & Allen serves for the panel heating, the fresh-water and salt-water heating for the slipper baths, and also the swimming-pool water heating. It is automatically controlled and the electrodes are operated hydraulically. A load control relay governs magnetic valves which operate on either side of the hydraulic piston so that the electrodes are raised and lowered according to the setting of the relay. It takes 15 minutes to lower the electrodes between their extreme limits. The maximum electrode loading is 1,300 A, but the load control relay can be set to any figure required. The moment the operating switch on the control board is put in the "on" position the primary pump for circulating water between the boiler and four large thermal storage tanks commences to operate.

Because of the static head under which the boiler operates the boiling point is 250 deg. F. Water is taken in at the top of the storage tanks and leaves at the bottom. The primary circulation is closed and apart from make-up for losses the same water is used continuously. Heat is "exchanged" in the 10,000-gallon storage tanks, and the panel-heating system, which embraces embedded elements in the walls and ceilings, amounts to a secondary self-contained system with its temperature maintained by means of make-up from the tanks.

The swimming-pool water is heated to about 75 deg. F. by means of a similar heat-exchange system incorporated in the circulation scheme of the purification plant. This consists of a battery of three filters through which the water is drawn by a 10-h.p. motor-driven pump. Chlorine gas, alum and soda are the purification elements and the water is drawn through the chemical shunt feed apparatus into the tops of the filters. From the bottoms of the filters the water passes to the pool *via* the heat-exchange equipment. The purification plant deals with 37,500 gallons per hour or one complete turnover in four hours.

Four 1,000-gallon calorifiers, two for fresh water and two for salt water, are also served from the electrode boiler. They are supplied from roof storage tanks and they are thermostatically controlled by Sarco equipment. For the hot rooms of the turkish baths there are two trunking systems, one fitted with a 36-kW bank of heaters for the high-temperature air supply and one with a 64-kW bank of heaters for the low-temperature air supply. Each bank is arranged in four groups and each group is controlled separately by a Satchwell thermostat. Air is "pulled" in through the filters, is passed over the heater bands in direct contact with grid resistors and into the hot rooms at the top, all under the influence of a small intake fan. In the turkish bath equipment room the intake fan first runs up after operation of the master switch in the boiler room and then the clapper switches controlling the elements "come in" automatically. Air is extracted from the bottoms of the hot rooms by means of an extract fan in the boiler house.

About forty persons a day can be accommodated in the turkish baths and a recent week's consumption was 2,170 kWh. Mr. Bond, baths superintendent, told us that many visitors had spoken very highly of the dryness of the electrically heated air, as compared with gas- and coke-heated air, in that there was less "burn" to the skin with the same actual temperature.

The swimming-pool lighting is worthy of special mention. The bulk of the natural lighting is through five roof laylights, each measuring about 25 ft. by 20 ft. Over each laylight are suspended six 300-W intensive reflectors. Above the amphitheatre there are eighteen 150-W "Gecoray" reflectors arranged flush with the ceiling and recessed from the false roof. Some of the fittings are of real bronze construction and they are all totally enclosed so as to give due protection from the sea air. In similar recessed housings there are two 500-W adjustable spot lights for use in connection with exhibition diving.

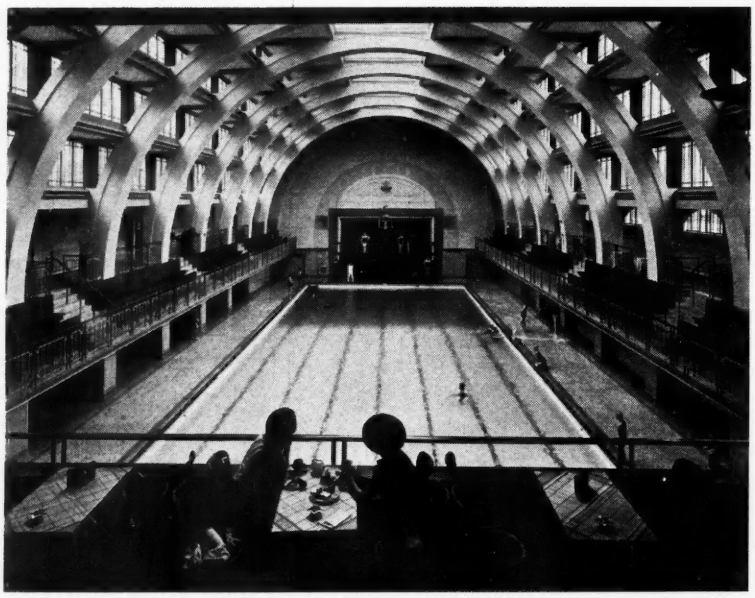
The solarium is a room measuring about 40 ft. by 45 ft., half of which is practically wholly surrounded by glass. To reproduce sunlight conditions there is in each section of the solarium a special pendant sunlamp which gives a mild output of tonic ultra-violet radiation, which is regulated by "Vitaglass" filters so as to ensure freedom from irritant wavelengths and consequent safety for the eyes. The pendants are used with the arc tubes suspended 13-14 ft. above floor level, *i.e.*, equivalent to 10-11 ft. above the shoulders of sunbathers when seated or reclining below the lamps. At this distance, following authoritative recommendations, the inten-

sity of ultra-violet rays is such that bathers, whilst enjoying a degree of benefit the whole time they use the lounge, can safely remain for periods up to 10-12 hours without over-exposure.

The sources of radiation consist of two Hanovia self-starting mercury arc tubes fitted in each pendant. The ultra-violet rays are generated by a mercury arc, within a tube of special glass having the requisite tranparency in the ulta-violet spectrum. The electrical load for each of these arc tube circuits is 400 W.

A Sturtevant vacuum cleaning plant and a system of clocks which operate synchronously on both a.c. and d.c. are all parts of this interesting installation. The equipment for the heating, ventilating, salt and fresh water, and the turkish-bath services was supplied by G. N. Haden & Sons, Ltd.

Messrs. Norman Aish were responsible for most of the actual cabling and wiring in the building and also for the lighting installation and the slotted angle steel distribution board.



The larger swimming pool of St. Marylebone baths *[Elec. Rev. photo.*

The St. Marylebone Baths

At the new baths of the St. Marylebone Borough Council, where there are two swimming pools with water areas of 132 ft. by 42 ft. and 100 ft. by 30 ft., hot water is supplied by electrode-boiler and thermal-storage plant for warming the swimming-pool water, for "domestic" hot-water supplies, for space heating the building and also for air warming in connection with the air-conditioning plant. The electrode boiler for these services has a capacity of 2,500 kW and the total capacity of the two storage tanks is 35,600 gal.

By circulation through the electrode boiler the water in the storage tanks is heated to a temperature of about 240 deg. F. under a head pressure, and it provides for the various services either by direct heating, as in the case of the space-heating system, or through heat-exchange equipment as in the case of the swimming pool water. Automatic control of the electrode boiler is effected by hydraulic operation similar to that of the Bournemouth boiler, the servo motor, which is governed by an Arca controller, being, in turn, controlled by sliding resistance equipment. For emergency use a two-way valve governing the flow of water to either side of the hydraulic piston provides for hand control. The boiler is supplied from the St. Marylebone electricity undertaking at 6.6 kV on the off-peak load principle.

By means of mixing valves which are thermostatically controlled, water is circulated through the space heating system at any desired temperature between 100 deg. F. and 250 deg. F. by motor-driven centrifugal pumps. The swimming-pool water is heated by calorifiers at the filter plant. This is a Candy installation and operates similarly to the equipment already described in this article.

In each case, *i.e.*, large or small pool, the water passes through the calorifier direct from the filter plant and is then aerated. For the large pool the water is circulated at about 60,000 gal. per hour, and for the small pool at about 25,000 gal. per hour. Roughly, a complete turnover is effected in each case in about four hours. The large pool plant is served by two 11 h.p. motor-driven pumps and strainers, and the small pool plant by two 5 h.p. motor-driven pumps and strainers.

There are a laundry and a public wash-house attached to the baths and hot water supplies to these are provided by four calorifiers, two for soft water and two for hard. These calorifiers are fed from the thermal storage tanks, the water for consumption being heated to about 150 deg. F. by heat exchange. The calorifiers operate automatically by means of thermostatically controlled diaphragm valves.

For the plenum air ventilation and conditioning system air is taken from the building by roof extractor fans and is drawn down to a chamber in which it is spray washed and heated. At each side of the chamber, where the spray nozzles are situated, there are finned pipes through which hot water for the thermal storage plant is passed. It should be made quite clear that this air heating is not intended as a space heating service, but merely to assist in the process of air cleaning by virtue of expansion. From the cleaning chamber a pump, driven by a 7 h.p. Veritys motor, passes the air on through the vents in the building. The extract fans at various parts of the building and the inlet fan are all arranged for remote and centralised control for a panel placed near the actual cleaning plant.

Steam services to the laundry and wash-house are provided by a 700-kW electrode steam boiler, which is designed for a maximum working pressure of 80 lb. per sq. inch. This boiler, which is not supplied on the off-peak load principle, serves the laundry equipment direct, but its control is otherwise similar to that of the hot-water electrode boiler. The thermal storage plant was supplied by Sulzer Bros. (London), Ltd.

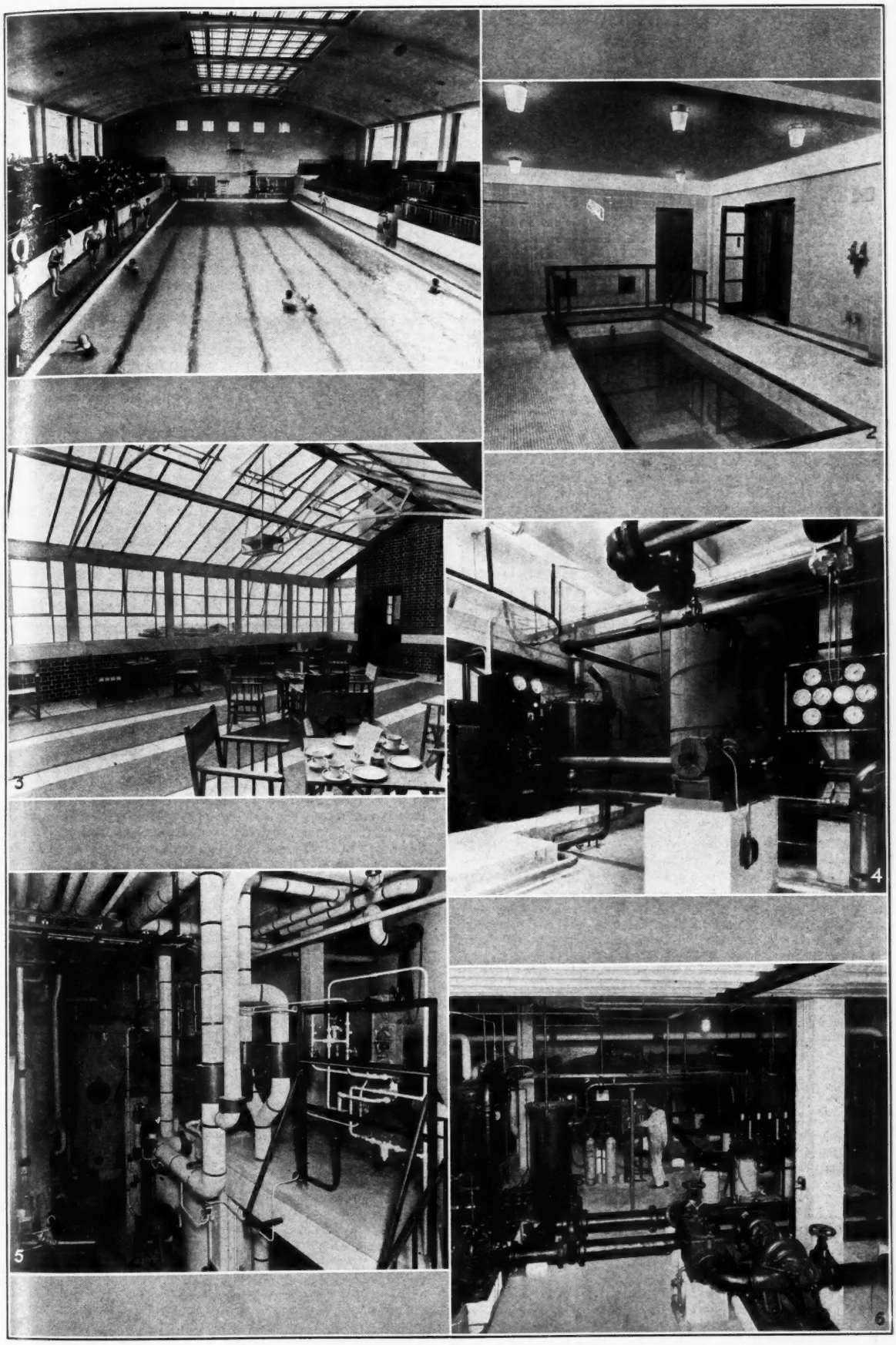
Power Supply in Poland

THE report of the Trust Métallurgique, Electrique et Industriel, of Brussels, which has a financial interest in a large number of undertakings in Poland, contains some interesting details of the progress of electric power supply in that country during 1936. The sales of power by the Société Centrale Electrique Regionale du Bassin de Dombrowa amounted during the year to 52,316,504 kWh, as compared with 39,962,746 kWh in 1935, an increase of 30 per cent. During the year the load on the power station increased to 27,186 kW, largely on account of the securing of concessions for supply to a number of additional areas which necessitated the establishment of eight new transforming stations. The company has now 41 miles of underground cables and about 190 miles of overhead lines.

The sales of the Société Centrale Electrique Regionale du Bassin de Cracovie during 1936 amounted to 32,453,967 kWh, this being an advance from 30,610,932 kWh in the preceding year. As the result of a propaganda campaign 3,691 new consumers were obtained during the year, increasing the load on the station to 14,414 kW.

The Société Centrale Electrique de la Région de Varsovie (Pruszkow) reports sales amounting to 40,684,772 kWh for 1936, as compared with 35,594,178 kWh in the preceding twelve months, an advance of 14.3 per cent. During the year the number of consumers rose from 26,002 to 30,947, and the load on the station from 20,644 to 32,934 kW. The company has commenced the supply of power to the little towns of Grojec and Tarczyn, the distributing mains now having a length of 574 miles.

The sales of the Société Centrale Electrique de Bielsko-Biala increased from 10,994,676 kWh in 1935 to 11,550,753 kWh last year, equal to 132 kWh per inhabitant per year. The number of consumers advanced from 13,272 to 14,323 and the load from 16,726 to 19,059 kW. The output of the electric power station owned and operated by the Silesia Colliery Co. amounted to 30,738,280 kWh, as against 30,181,130 kWh in 1935.



[*Elec. Rev.* photos

Some of the arrangements at the new Bournemouth and St. Marylebone Baths

1. The Bournemouth swimming pool. 2. Shampoo room and turkish baths, Bournemouth. 3. A view of the Bournemouth solarium, showing sunlamp pendant. 4. Part of the Bournemouth boiler room—electrode boiler centre, control panel left and thermal-storage tanks right. 5. Calorifiers (left), electrode boilers and thermal-storage tanks (right) at St. Marylebone. 6. The filtration and heating plant for the St. Marylebone swimming pools.

Instrument Transformers. By A. Hobson, B.Sc.

Experiences with the 1936 specification

THE present British Standard Specification for Instrument Transformers (B.S.S. 81/1936) has been in force for nearly a year, and the time is opportune to put forward a considered opinion of it. My criticisms are based to some extent on my own experiences during recent months.

There is no doubt that this specification is a vast improvement on its predecessor. The original edition, issued in 1927, had an unfortunate fate. About two years after its introduction all existing standards of current-transformer accuracy were upset by the discovery of the nickel-iron alloy, Mumetal, so that for the next seven years the specification was out of date.

In view of this it is difficult to understand why the new specification could not have appeared much earlier. To my personal knowledge it is well over four years since work on it was commenced, and no important technical developments have taken place since then to hinder its preparation, apart from the inexpensive, simple and accurate method of current-transformer testing introduced in 1934 by Dr. Arnold, of the National Physical Laboratory.

In the definition of phase difference it is good to see that the most commonly used notations have been adopted, that is, a leading phase angle (secondary vector leading reversed primary vector) is regarded as positive and a lagging one as negative. As regards ratio error, the formula gives a positive result if the secondary current, or voltage, is higher than its nominal value; this is the most used method, but whether it is meant that way in the specification is by no means quite clear.

The changes in the pressure tests were to be expected. The test has been stiffened for working voltages between 440 and 660, and special tests have been provided for transformers used on systems with one line earthed, thus raising the potential of the other lines above earth 1.73 times. The test pressure for such transformers has accordingly been raised to 1.73 by 2.25, or 3.9 times the line-to-line voltage, plus the usual 2,000 V. It is important to note that the onus is placed on the purchaser to state that this special test is necessary. If he does not mention it the manufacturer is entitled to assume that only the normal pressure test is needed.

Test Voltage Criticisms

There is a new rule that all sections of the same winding must withstand 2,000 V between them. Surely the primary sections of high-voltage transformers will require a much greater test than this? I am rather sceptical of the value of the table that gives permissible reductions in test voltage when the duration of test is increased. My own experience is that a transformer which sparks over at, say, 20 kV will usually withstand 18 kV for an indefinite period. If I were trying to get a doubtful job through test I would much rather give it 22.5 kV for 2 min. than 27 kV for 1 min., which are equivalent values in the table.

Current transformers still keep the old classes of accuracy, *viz.*, A, B, C and D, with little change, but in addition there are two special classes AL and BL for laboratory work and three metering classes, AM, BM and CM. The highest accuracies are of the AL and BL classes, the former giving limits of 0.15 per cent. and 6 min. at the worst point. This class is intended to cover standard transformers as used in instrument-transformer testing, but most of those at present in use have errors much less than this. A testing transformer with more than 2 min. error is rare, and some transformers have been built having errors of less than 0.25 min. However, the AL class will serve its purpose very well, as transformers complying with it are considerably less expensive than the super-accurate ones. This will cheapen current-transformer testing and will encourage some of the smaller supply undertakings to do their own testing.

Slope of Error Curves

The metering classes of accuracy introduce a feature which other countries have had for years, namely, control of the *slope* of the error curves, as distinct from absolute error. The variation in error from full current down to $\frac{1}{10}$ current is vastly more important to the meter engineer than the absolute error. He can arrange a meter to run, say, 1 per cent. fast at all loads, but he cannot get it to run 1 per cent. fast at full load, 1 per cent. slow at $\frac{1}{5}$ load, and 2 per cent. slow at $\frac{1}{10}$ load.

Class AM specifies absolute errors of 1 per cent. and 30 min., with allowable variations of 0.5 per cent. and 15 min. between 120 and 10 per cent. rated current. This class is approximately the same as the "precision" class specified by the C.E.B. during the last seven or eight years. A class AM transformer is a very good one for its job, but I know of one eminent engineer who only permits about half these variations on his metering transformers.

One of the most interesting features of the specification is the provision of regulations concerning the short-circuit rating of current transformers. Maximum current densities allowable in primary windings for various durations of short-circuit are given. These densities are designed so that the temperature rise in the primary will not exceed 200 deg. C. under the worst conditions. The method of working this out is fairly simple, it being assumed that all the heat generated is stored in the winding.

The temperature rise of 200 deg. C. may seem extremely high compared with the normal working value of about 50 deg. C., but this is only a transient condition representing the worst that can possibly occur, and as soon as that temperature is reached the line is cut out and cooling begins.

Mr. A. Hobson has had a number of years' experience in the manufacture of instrument transformers

Further remarks on short-circuit rating are given in an appendix (C), the first twenty lines of which are sensible and pertinent. The remaining two and a half pages, I think, would have been better left out, as I am convinced that they will only confuse the buyer and hinder the manufacturer.

The term "overcurrent factor" is extremely useful when applied to standard designs of current transformers which are made for various current ratios and which employ normal cross-sections of copper in their primary windings. As applied to the second example in this appendix I consider that its meaning is likely to be obscure to everyone but the handful of people who design current transformers. In this example, a man who wants a 20/5-A transformer is fobbed off with a 40/5 because of the large overcurrent which the transformer has to stand. This is quite justifiable, but such cases are comparatively rare, and I think it would be preferable to leave the manufacturers to decide each case on its merits rather than tie their hands with a rule which can only be described as extremely empirical.

An Omission

The entire omission of what I consider to be the most important factor in the design of safe current transformers—the question of the insulation between primary turns—is astonishing. In my experience, at least as many current transformers break down between primary turns as from other causes, including overcurrent. The primary turns of a current transformer are in exactly the same position with regard to surges as the extreme end turns of a power transformer connected across the line. The latter question was regarded so serious that a special B.S. Specification (422—1931) was introduced to deal with it. Surely some information on it is required in the case of current transformers? I suggest that a satisfactory solution would be a rule that the primary insulation should stand half line voltage between turns for ten seconds.

The changes in the specification regarding voltage transformers are practically confined to the accuracy clauses. Recognition has been given to the wide difference between errors with low power-factor burdens and those at unity power factor. This, I hope, is helping to remove one source of error in metering. As it is impracticable to test meters with voltage transformers connected, it is the practice to make an allowance for the transformer errors at the time the meter is being calibrated.

This allowance has so far been based, quite erroneously, on the errors of the transformer on a unity power-factor burden; it should, of course, be based on the errors at the working-burden power factor. The different errors allowed in the new specification at unity and 0.2 power factor should help to bring home this fact to meter engineers.

The two new accuracies, AL and BL, for portable precision transformers, is proving very useful, but I would have preferred the voltage range to be larger, say, from 120 per cent. rated voltage down to about 20 per cent.

Industrial Heating. By E. M. Ackery

Electrical progress and prospects

Mr. E. M. Ackery, B.Sc.

IN reviewing the development of the industrial heating load over the past twelve months or so there are many indications not only of solid progress, but also of a general change of outlook towards this branch of electrical development—the last to receive serious consideration, but perhaps the greatest so far as potentialities are concerned.

It must be very gratifying to that relatively small band of enthusiasts who have persistently pointed to industrial electric heating as a load of the greatest possible importance as an outlet for electrical energy to notice the very large increase in the number of articles on the subject that have recently appeared in the technical Press. Actually, the total amount of space that has been devoted to various aspects of industrial heating in the last eighteen months is ten times as much as appeared in the previous two years.

There are, of course, two kinds of publicity, that which is put out and paid for and that which appears automatically as a result of the demand fostered by the first kind. Editorial publicity belongs to the second category, and there is consequently good ground for claiming that considerable interest has lately been aroused inside the electrical industry. The importance of this is not at all lessened by the fact that this publicity is within the industry itself. Few loads grow to any great extent until they are actively encouraged by the supply industry, and frequent references in the Press are a very potent factor in stimulating the interest of those members of the supply industry who have not hitherto taken any active steps to develop the load. The more the industry talks about electric heat the more rapid will development be. It is to be hoped that in the near future a paper on the subject will be included in the programme of the I.M.E.A. Convention.

Much more could be done in the direction of what may be called internal publicity as there must be many interesting applications that receive no publicity. Supply engineers have little spare time, it is true, but time spent in giving publicity to electric-heating developments is time spent in the interests of the industry at large.

Incidentally, it is in the hands of the supply industry to develop the load in a very direct way. The value of electrical goods and materials that are purchased by the supply industry each year reaches a very large figure, and if in the manufacture of all of these goods the maximum use of electric heat were made a substantial increase in the output of electricity would result. For example, if all electric cookers were vitreous enamelled in electric furnaces the annual consumption of electricity would be about five million kWh. When other equipment and other processes are taken into account—stove enamelling, heat treatment of steels, soft-metal melting, and so on, it is not difficult to believe that the total would assume considerable proportions. This may sound very like taking in each other's washing, but it does not look well for the laundry proprietor to send out his washing to a rival establishment.

Activity of Manufacturers

The absence of separate returns of the industrial load make it quite impossible to assess the increase during the past twelve months. That it is considerable is, however, abundantly evident. Without exception, manufacturers of furnaces and heating equipment have been very busy. As a rule the appetite of manufacturers for orders is insatiable, but even they seem to have been satisfied and have been hard put to find the necessary materials and skilled labour. It is of interest to note that one electric-furnace manufacturer has recently moved his works in order to allow of expansion, while another has opened large extensions.

There is no doubt that the armament programme and the general improvement in trade are responsible for a great deal of the recent progress; the increased activity in aeroplane construction, with its corresponding increase in the demand for aluminium alloys, has, of course, been particularly advantageous to controlled electric heat, but it would appear that electricity is getting a fair share of the new business. The ability of the electric steel-melting furnace to deal with a large proportion of scrap was one of its great assets before the world shortage of this commodity. That the demand for electric steel-melting furnaces has not been thereby lessened shows that the other advantages are sufficient in themselves.

An industry whose product is advertised as a sign of excellence by its users has some reason for satisfaction. Examples are the advertisement of a well-known manufacturer of safety-razor blades who tells the public that they are "electrically treated," and the advertisement of a motor car stating that various vital parts are made of electrically heat-treated steel. A further example was the exhibit at the British Industries Fair of an electric decorating kiln to emphasise the special quality of the user's glazed tiles.

In spite of the progress that has been made there is no excuse for any slackening of effort. Even if the possibility of extending the temperature range of the resistance furnace is disregarded for the time being there is still plenty of scope for development. The list of the titles of the excellent "Electric Heat" booklets published by E.D.A. form a very good indication of applications which are well worth investigation. Tar heating, heat treatment of iron and steel and non-ferrous metals, swimming-bath warming, the printing trade, vitreous enamelling, low-temperature ovens, and glass and ceramics are all directions in which additional loads may be obtained, while the possibilities of the smaller miscellaneous applications are even greater. There are, however, many applications that are well within the range of existing equipment where little or no progress has been made, typical examples being annealing and tinning of tinplates and glost firing of pottery.

Only about 8 per cent. of the 100,000 kW of electric boilers in operation in this country relates to steam boilers used for industrial purposes. In Switzerland, out of a total of 175,000 kW, about 70 per cent. is used in industry. This difference cannot be altogether explained by the words "water power." Granted that surplus electricity costs nothing when produced by water power, while we are always faced with the coal cost of generation at the very least, yet in Switzerland very cheap surplus electricity is only available at certain seasons and the majority of industrial electric steam-boiler installations not only have full stand-by capacity in fuel-fired plant, used for lengthy periods each year, but also steam-storage tanks.

There is, I believe, no electric boiler installation combined with steam storage in this country, and, indeed, no industrial electric steam-boiler plant of any great size. One is forced to the conclusion that our Continental neighbours are far more convinced of the merits of the electric steam boiler than we are when they will use them in spite of the very large capital expenditure involved in the steam-storage equipment and the stand-by fuel plant.

Electric welding provides a load that is not altogether welcomed by some engineers. Admittedly, it causes technical difficulties under certain circumstances, but these difficulties will have to be faced and overcome. The chief non-technical objection is that of poor load factor, but this really belongs more to the past than the future, and it is to the future that the supply industry must look. As with most loads the overall load factor increases rapidly with the number of connections, while the works tendency to-day is to regard a welder as a specialist who should spend his whole time welding rather than use electric welding for an odd job here and there. The high cost of automatic-resistance welding machines should ensure that they will be in use for the greater part of the day.

An Industrial Heating Exhibition Needed

One of the most valuable assets of electric heat is its ability to deal with practically any demand for heat. Unfortunately, this is very difficult to "get across." What is needed is an industrial heating exhibition in which the industry can show the public the whole story of electric heating, from the soldering iron to the arc furnace. Such an exhibition is long overdue, and it is to be hoped that if and when the National Electrical Exhibition becomes an accomplished fact the opportunity will not be lost.

It is, of course, well known that nickel-chromium alloys are not capable of giving furnace temperatures of much above 1,150 deg. C. There is, however, an extensive range of operations between 1,150 and 1,350 deg. C. Hardening high-speed steels and pottery biscuit firing are two typical examples in different industries, and there is little doubt that many people are waiting for the electric-resistance furnace that can deal with these and similar processes.

Manufacturers in this country are most uncommunicative on this subject, although considerable progress appears to have been made on the Continent with Fe-Cr-Al alloys and similar materials. What this attitude means is very hard to say; it may be a natural reluctance to disclose experimental information, or it may be that they are not satisfied with the performance of the new materials, but have something to learn

from the Continent, and in particular from Germany.

It is possible that, as is the case with the electric steam boiler, the Continental manufacturer is prepared to go to greater lengths to obtain the benefits of electric heat than manufacturers in this country, and that which is acceptable over there would not be over here, but it will be a great pity if progress in this country is hampered by an excess of caution.

The value of international interchange of experience cannot be exaggerated, and the formation of a British National Committee to the International Institute of Electric Heat, recently announced in the ELECTRICAL REVIEW, may do a great deal to stimulate development in the direction of higher temperatures.

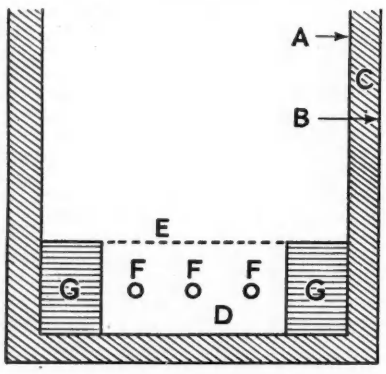
To sum up the present position, substantial progress is being made in the development of the industrial heating load, but still greater efforts are needed. These loads do not come automatically, but by the expenditure of much thought and effort on the part of the sales staff. To develop the load to its fullest extent demands the appointment of a full-time specialist. Is it too much to hope that if the distribution of electricity is concentrated in the hands of relatively few undertakings each will have its own specialist heating engineer?

Soil Sterilisation. By F. C. Robinson

How to construct an electrically heated chest

IT is only in the past few years that the benefits from sterilising soil in which plants and seedlings are propagated have been fully realised. The procedure had previously been known, but probably one of the chief reasons against its more common adoption has been the trouble of dealing with the process by the usual methods of raising steam, with its attendant cost of installing the equipment, coupled with the labour and attention involved in keeping a coal fire going. The cheapness and convenience of operation of an electrical equipment changes all this, and the benefits previously obtained by only a few are now within the reach of nurserymen and amateurs alike.

Most people are gardeners in some degree, and many, after carefully selecting seeds, have been disappointed at the ultimate results. Sparse germination from the best strains, damping off, insects or fungi, excessive growth of weeds, and other troubles have often resulted in a poor quantity and quality of flowers or fruit.



How the sterilising chest is constructed
A, inner tank; B, outer casing; C, lagging; D. water reservoir; E. expanded metal grid; F. elements; G. grid supports

Most of these troubles may be overcome by giving the seeds, seedlings or cuttings a good start in life in sterilised soil. Feeding with various manures is all very well for the established plants, but they must have a "good constitution" to begin with, and prevention of disease is far better and more economical than curing it.

Various methods of soil sterilisation have been and are being used, but by far the simplest and most economical is to impregnate the soil thoroughly with steam for a period sufficient to kill the pests. To raise steam for this purpose electricity provides the most convenient method as the operation can be performed at any time and with economy.

To prepare a suitable chest, first obtain a suitable cistern. For ordinary amateur purposes, where up to 8 to 10 cu. ft. of seed or potting loam is required at a time, an ordinary 80- or 100-gallon galvanised tank is ideal. Second-hand ones are usually obtainable at a reasonable figure from any builder. The loading of the elements depends on the size of tank and the time in which it is required to bring the water to boiling point, but for a tank of the size mentioned a loading of 3 kW will usually be found suitable. This can be arranged in six 500-W or two 1,500-W elements.

To reduce the quantity of water in order to speed up boiling, two timber (9 in. by 4 in.) or brick supports are fitted along each side of the bottom, as illustrated. In addition to reducing the volume of water, these form supports for the grid on which the loam rests. As the usual width of such a tank is about 2 ft., the effective width for the reservoir is reduced to 1 ft. 4 in. Insert the immersion elements from either end so that they are within an inch or two of the tank bottom, the elements being as long as is practicable. With a tank about 3 ft. long, 15 in. to 18 in. elements will meet requirements.

The grid for carrying the loam can be of galvanised expanded metal. Another good method is to slot the timber supports every 3 in. to a depth of ½ in. and lay short lengths of galvanised conduit across the supports, resting in the slots.

Having wired up the elements in two circuits the tank can be put into commission. Fill the reservoir with water to a depth of 6 in. (about 12 gal. is necessary) and switch on. While this is heating up lay a sheet of coarse canvas—strong hessian is quite suitable—on the grid, allowing sufficient length and width to reach nearly to the top of the tank. Spread the loam (preferably sifted) lightly and evenly on the canvas to a depth of up to 1 ft. 6 in., according to the quantity to be sterilised. Wrap over the loose sides and ends of canvas and place a strong, close-fitting lid on the tank. As the water boils the steam will gradually percolate through the soil and so effectively kill all vermin, harmful bacteria, and also weed seeds.

A sound method to ascertain when sterilisation is complete is to place a small potato in the middle of the loam about 2 in. from the surface. When this is cooked it is certain that no pests remain alive or seeds fertile in the soil. For sifted loan to a depth of about 1 ft. to 1 ft. 6 in. two to two-and-a-half hours after the water boils will usually be found sufficient. When the water boils the elements can be switched to half power to maintain simmering, as furious boiling may make the lower soil "soggy" and unsuitable for immediate use.

In the sketch the tank is shown lagged. This is desirable to reduce loss of heat by radiation. For the same reason it is desirable to have a well-lagged top. Various refinements may be made to suit individual requirements. For instance, mounting on a trolley for portability, a hinged side for ease of loading and unloading, a drain cock for emptying or a feed tank for automatically replenishing the reservoir. The design shows how the job may be tackled most economically.

Where only a small quantity of loam at a time is required, say, sufficient for three seed boxes, or for trying out results before investing in a larger chest the following methods involve no outlay and give equally efficient results :—

(1) Fill a large tin—a standard biscuit tin will do—with loam, firmly fix on the lid, and stand it in an electric cooker oven. Switch on until a heat of 350 deg. to 400 deg. F. is obtained, leave this for half to three-quarters of an hour, by which time the loam is sterilised in its own steam.

(2) Stand a trivet in a domestic wash boiler with about 2in. of water below the underside of the former. Place the loam in a small sack on the trivet, switch to full until the water boils, then reduce to low, allowing it to steam for about three-quarters of an hour.

In order to test the results obtainable by sterilising the loam I purchased four threepenny packets of daisy (*bellis perennis*) seeds (two red and two white). Of these, one packet of each was sown in the sterilised loam and the other two packets in the unsterilised loam. Germination in the sterilised loam was slightly in advance of the others, but the comparative results were amazing. The unsterilised loam produced about 200 seedlings per box and the sterilised produced 1,015 and 1,025 seedlings. After purposely leaving the seedlings in their original boxes for two months, the whole of the seedlings in the unsterilised loam "damped off," whereas those in the sterilised loam showed no signs of this bacteria.

The Ministry of Agriculture and Fisheries Bulletin No. 22 (price 1s.) gives full details of various methods of soil sterilisation (steaming, baking and chemical). In this it is stated that it is practically impossible to overheat the soil by steaming unless dry superheated steam is used, and soil can be rendered infertile by overbaking, especially if it is too dry.

A nurseryman who commenced steam-sterilising his loam for seed and potting in June last year informs me that it has meant a considerable saving. He also states that in several cases he has used sterilised loam for top-dressing lawns with exceedingly good results.

Lightning in Rural Areas. By T. C. Gilbert, A.M.I.E.E.

Leakage trips as a means of reducing fire risk

CONSIDERABLE investigation into damage and loss from fire following lightning strokes has been undertaken on the Continent recently, more especially as concerns buildings fed by overhead lines for electrical services. It has been held that in most cases the lightning stroke, or its induced secondaries, has been brought by means of such lines into a building that might otherwise have escaped injury.

Fire is a much greater menace in rural areas than in towns and cities, and even transcends that of shock. The majority of buildings are connected to extensive networks of overhead lines, some of which are erected on high ground. Furthermore, there are as a rule no fire-fighting appliances within easy reach of the country dweller, or there may be a temporary lack of water; the usual type of building is quickly destroyed by fire, often with assistance from its inflammable contents.

Lightning strokes in towns are not, as a rule, attended with fire, whereas investigation abroad has proved that in country districts this risk is great. As most of the buildings concerned in Germany and Switzerland were electrically equipped, no definite evidence by comparison is available as to the probability of overhead lines rendering any building liable to lightning and fire risk.

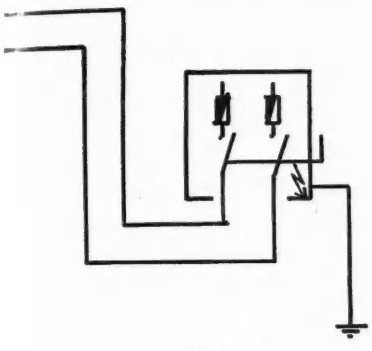


Fig. 1

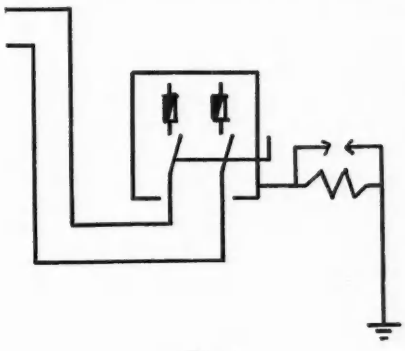


Fig. 2

Experience in Canada

During investigations in Canada, however, especially in the Province of Ontario the view was advanced that such lines do undoubtedly contribute to the risk. Considerable experience was available from that quarter, as in the years previous to the inquiry Ontario had experienced about 70 per cent. of the lightning fires in all Canada, and the number in one year amounted to 1,100, of which about 900 occurred in rural areas. There is now in force a Lightning Rod Act, and a note to Regulation 24 states (page 30): "It is bad practice to have metal fences, metal clothes lines or any exposed wires connected to buildings as they act as feeders for electrical energy. Where such are found to exist protection may be provided by inserting 3-ft. strips of 2-in. by 2-in. hardwood next the building to the ends of which, placed longitudinally, the ends of the disconnected wires are made fast. This will break up the electrical continuity of the line."

Such methods are inapplicable to overhead lines, which are required, under the regulations of the Hydro-Electric Power Commission, to be provided with lightning arrestors where they enter buildings. (Sec. B.V., p. 23.) This would appear to establish that buildings with overhead lines attached are more liable than others to damage from lightning, with possibly subsequent fire.

Investigation then proceeded along the lines of establishing why the rural building should be more liable to fire than the town building, where the subsequent damage was usually confined to a few blown fuses. The obvious explanation was the generally good earthing conditions found in towns, contrasted with the certainty of difficult conditions in country districts. The Swiss investigation established that a lightning stroke, or an induced secondary, falling upon a low-voltage line would be carried by it into the building and would then spill over to the nearest earth path. For metal-clad wiring systems or control gear this path was generally shortest and of least impedance to the case, and simultaneous discharges would sometimes take place from wiring to earthed conduits. The line current almost invariably followed this discharge, if the path were sufficiently short, in the form of an arc, and considerable damage occurred if this were not immediately extinguished.

In the town installation the low resistance of the earth connections allows this line current to build up rapidly to such a value that the circuit fuses are blown, and the arc disappears in a very short time. In the country an arc will probably be set up, but the resistance of the earths, not only at the installation but also at the sub-station, will limit the current to a value probably too low to blow fuses. Unless the fuses are of very small rating the line current will continue to flow over the gap previously bridged by the lightning discharge without interruption, until the rise in resistance of the earth circuit or electrode, by reason of heating, gradually reduces the current to a value low enough for ready extinction. There is always the possibility that the arc may be set up at some point not controlled by the installation fuses, as is shown in fig. 1, the spill-over having occurred in the main switch.

The persistence of the line-current flow for even a few seconds sets up a grave risk of fire, not only by reason of the arc, but also from the overheated and overloaded earth circuit. There is the possibility of the line current seeking alternative paths to earth and increasing in magnitude, but this would, of course, depend upon the installation lay-out and the existence of such paths. In the average small installation there would be only the one earth connection, made to one electrode, and this is all that need be taken into consideration at the moment.

Various steps have been proposed with a view to limiting or preventing this line current flow, even to the extent of placing an inductance in the earth circuit. Some slight success has followed experimental work, but the introduction of additional impedance into a circuit already of too high resistance for practical purposes, might prevent the operation of leakage protective devices under normal earth faults. The proposal to introduce this artificial limitation of fault current in the earth circuit cannot be viewed with equanimity, as the conflicting requirements do not lend themselves to solution by such means. For instance, if the inductance is low, designed to allow the passage of the high-frequency lightning or induced charge, then the line current at low frequency will not be impeded; on the other hand, a high inductance suitable for the latter purpose will prevent the dissipation of the high-frequency discharge. A compromise of shunting the inductance by a lightning gap (fig. 2) does not remove the objection to the presence of additional impedance in the earth circuit; the retention of the inductance was necessary in all cases. The price of success in the prevention of line current flow following flash-over from the lightning stroke effect was to render the earth system inoperative in the case of an ordinary earth fault.

At about this stage Inspector Germiquet, of the Fire Protection Association of the Canton of Berne, announced that from his observations buildings equipped with earth leakage trips were not susceptible to the troubles under investigation, owing to the fact that the trip coil presented a very high impedance to the line current, although in some cases this coil had been damaged by lightning. In areas especially liable to lightning the comparatively delicate trip coil had been shunted by a gap, integral with the coil, and no further damage had resulted. Experiments showed that a non-inductive high-resistance shunt was as effective, but more expensive, and as the gap was sufficient, this has now been standardised.

German Practice

During a recent stay in Germany I visited the district round Wesel, Duisburg, and the rural districts between Cologne and the Dutch border. Every facility was afforded by the Rheinisch-Westfälisches Elektricitätswerk for the tests and investigation, and I was assisted throughout by the chief engineer of the company. In the Wesel offices I found a card index giving full details of the 28,000 leakage trips installed in that district, most of which had been installed between 1926 and 1930, about half of them in rural areas.

The records showed that in the early days some damage had been experienced from lightning, usually resulting in the destruction of the trip coils, the original types of which were wound with very fine wire. Following redesign, and the incorporation of a gap for the worst areas, no further trouble was experienced, and I was assured that for the past eight years no coils had been damaged by lightning. I was also informed that the installation of leakage trips had materially reduced the damage resulting from fire in the worst district,

Weselerwald. My investigation was confined to this area, in which many farms are connected by overhead lines to electricity supply.

The country is exceedingly flat and considerable salt deposits add to the conductance of the soil in certain localities, contributing to the excessive liability to lightning damage. Practically every farmhouse was equipped with a low form of lightning conductor, consisting of a horizonal rod running the whole length of the roof and supported by uprights about 18 in. above it. These conductors were bonded to heavy copper strips brought down to earth electrodes buried close to the buildings, generally near the point of discharge of water pipes.

The overhead lines were brought into the buildings in the large roof spaces, which were usually stuffed tight with hay or straw through which a way had to be tunnelled to reach the leakage trip at the termination of the incoming line.

In one case the earth wire ran parallel to the lightning conductor earth, and only a few inches from it, and its earth electrode was driven quite near that of the lightning conductor, while a bond from the water pipe was taken right across the earth tube of the lightning conductor. One engineer present stated that he would have no hesitation in connecting the leakage trip to the lightning conductor but for the existence of regulations to the contrary, and although this step cannot be recommended under any circumstances, it provides a definite expression of faith in the leakage trip as constructed to-day. The conjunction of earth and lightning-conductor electrodes in one spot (many examples of which were seen) was defended on the ground that the best place for the one must be the best for the other.

In all, forty leakage trips were inspected and tested, out of the 4,000 odd in the district. No attempt was made to influence my choice, which extended over as wide an area as possible in the affected district. Most of the trips inspected had not been examined for any purpose for six or seven years, although the year before last the number of lightning storms was above the average.

German engineers are emphatic that the use of the leakage trip, primarily installed with a view to eliminating the shock risk, has materially reduced fire damage. As this view is also confirmed by the Swiss authorities, the point would appear to be worthy of fuller consideration in this country.

The Distribution Proposals

Growing opposition

DURING the past few days emphatic opposition to the proposals set forth in the White Paper has been expressed by further important interests or organisations. The views of three of these are summarised below :—

Powell Duffryn Associated Collieries.—In his speech to the annual meeting of this company Mr. E. L. Hann, the chairman, referred to the proposals, which, he said, in many respects went far beyond those contained in the McGowan Report. Among other recommendations made by the McGowan Committee was one that the distribution of electricity, unless provided by statutory undertakings, should be made the subject of compulsory purchase on a " cost less depreciation basis." This proposal was, of course, almost the equivalent of confiscation, for no consideration was given to the supplier's loss of profit and goodwill, or to the fact that he might find himself left with such additional generating and other plant as had been installed in order to provide the supply, and which the new supplier would not be required to take over.

The Powell Duffryn Company, which was for many years the largest electricity producer in South Wales, had been approached from time to time by municipal authorities to supply electricity in districts where it had had the necessary facilities, but where no other supply was available. It had supplied electricity for a great number of years to its customers at a cost which, he believed, was as cheap as any in Great Britain and on conditions satisfactory to the consumer in every way. This had been rendered possible principally because the maximum colliery demand did not coincide with the maximum domestic demand on the company's stations.

Although the company was probably the largest of the unauthorised undertakings, it was not asked to give evidence before the Committee, nor had it been afforded any opportunity by the Government of expressing its point of view. It was difficult to understand on what grounds it was proposed to treat so unfairly those who had been maintaining a public service at a time when it was not obtainable from any other source, more especially when it was realised that the Electric Lighting Act of 1909 was obviously designed to enable such supplies as the company had been giving to become available to the public. Furthermore, under the present Government proposals, it seemed almost certain that the consumers would be required to pay more for their supplies than hitherto.

These Government proposals were being attacked from almost every quarter, but mainly for reasons other than those which affected the company. They intended to take all steps possible in conjunction with other colliery companies similarly placed to prevent such unfair proposals being put into effect, and they might find it necessary to ask shareholders to assist them by using their influence with their Members of Parliament if redress could not be obtained in any other way.

Chambers of Commerce.—A special committee of the Association of British Chambers of Commerce has forwarded to the Minister of Transport a lengthy report condemning the Government proposals and strongly objecting to the delegation of certain powers to the Electricity Commissioners. The following is a summary of the views of this committee and of the recommendations which are advanced in its report :—

1. The Association, on behalf of industrial consumers of electricity in the country, is of opinion that any legislation based upon the proposals in the "Outline" should be directed to obtaining a cheap supply of electricity.

2. The Association is of the opinion that the amount of power which it is proposed to delegate to the Electricity Commissioners with regard to distribution, regulation and cost of electricity is more likely to cause difficulties than to remove them in the smooth working of electricity distribution.

3. The division of the country into districts, and the grouping of undertakings in those districts, is a matter of such vital importance that no such division should be settled in the proposed Bill, but should be determined in accordance with the recommendations of the McGowan Committee (Paragraphs 142 *et seq.*).

4. Apart from the fact that the Ministry's " Outline of Proposals " differs in material respects from the intention of the McGowan Committee's Report, a very unsatisfactory condition arises from the close statutory relationship between the Ministry and the Electricity Commissioners. In practice the Commissioners will be plaintiff, judge and jury with respect to their own schemes, and it will not be at all an easy matter for the Minister to overrule their decisions.

5. Each scheme should be advertised and should then follow the procedure recommended by the McGowan Committee—provided, however, that there shall be a right of appeal to an independent tribunal in all cases.

6. The Minister of Transport should be required to hold an inquiry into any scheme at the request of any of the parties concerned and no existing undertaker should be compelled to sell or amalgamate unless that inquiry shows that the sale or amalgamation will result in more efficient service without increased cost to the consumer.

7. Every scheme of amalgamation should provide, *inter alia* :—

(1) The price to be paid for the vendor undertaking.

(2) That if for any reason the scales of charges for electricity in the portions of the area of the new authority are to differ from each other either temporarily or permanently, such variation in scales should be fixed by the same authority which settles the purchase price, and at the same time.

8. The new combined franchise of perpetual and purchasable undertakings owned or controlled by the same undertaker should be laid down in the Bill and should be for at least 50 years.

9. The proposed sliding scale for companies should be amended so as to maintain the incentive to further improvement.

10. In the interests of uniformity it is desirable that electricity undertakings should be assessed for local rates *in cumulo* on the principle adopted for railway undertakings.

11. The form of any capital issue should be decided by the issuing company, without control by the Commissioners.

Messrs. C. F. Spencer and T. Mensforth.—Mr. Charles F. Spencer, who was a member of the Williamson Committee on Electricity Supply, 1917-19, together with Mr. T. Mensforth, B.Sc., A.M.I.E.E., have produced a report commenting at some length on the Ministry of Transport's proposals and putting forward an alternative scheme.

The Ministry's proposals are considered to be of an experimental character which may lead to large capital losses being imposed upon preference shareholders, who would merely receive the par value of their holdings in the event of winding up, whereas to-day they stand at comparatively large premiums. It is considered problematical whether the consumer would benefit and the proposed methods of control are

deemed "undemocratic" and likely to lead to delays in development.

The large-scale methods proposed would jeopardise the local interest and personal touch so effectively maintained by existing undertakings. The schemes of compulsory amalgamation might result in increased capital expenditure and higher rates of interest. Compensation would have to be paid to many efficient local authority administration officers whose services would be lost to the industry and the new authorities would not be able to borrow money so cheaply as local authorities or established companies. Municipalities would lose contributions to their rates and any surplus received for their undertakings would probably have to be handed over to the acquiring authority.

Messrs. Spencer and Mensforth conclude that a Bill on these lines would be opposed by consumers and a large majority of undertakings, whereas a measure designed to secure co-operation and mutual assistance would be acceptable. They therefore propose the setting-up of a National Electricity Council representing all supply authorities, somewhat on the lines of the National Gas Council or the I.M.E.A. Under the auspices of this Council there would be arranged local and national publicity campaigns, other sales promotion methods and closer co-operation with local electrical contractors.

As an alternative to the "White Paper" proposals it is suggested that legislation should be passed to enable the establishment of a National Committee and District Committees. The District Committees (formed for each district in the Ministry's Appendix "A," or otherwise) would comprise three local authority and two company representatives and a member appointed by the Central Electricity Board. They would be empowered to consider and make recommendations to the National Committee upon such matters as forms of tariffs and prices, bulk supply charges, hire and hire-purchase terms, standardisation of systems, mutual assistance and co-operation, and the securing of economies and efficiencies for the benefit of consumers. They would have power to investigate the businesses of undertakings in the districts and would render reports to the National Committee within a given period.

The National Committee would consist of seven members—three local authority, two company and one Central Board, with an independent chairman appointed by the Minister of Transport. It would consider the District Committee's reports and make recommendations to the Electricity Commissioners for application nationally, to districts, or to an undertaking or series of undertakings. The Commissioners, acting as a judicial body, would consider the reports of the National and District Committees and would give effect to any recommendations which did not need new legislation, or communicate their findings to the Minister where new legislation was required.

It is considered that in about two years the effectiveness or otherwise of such a system would be evident and it is therefore proposed that this period should be allowed the industry to prove its ability to reorganise itself.

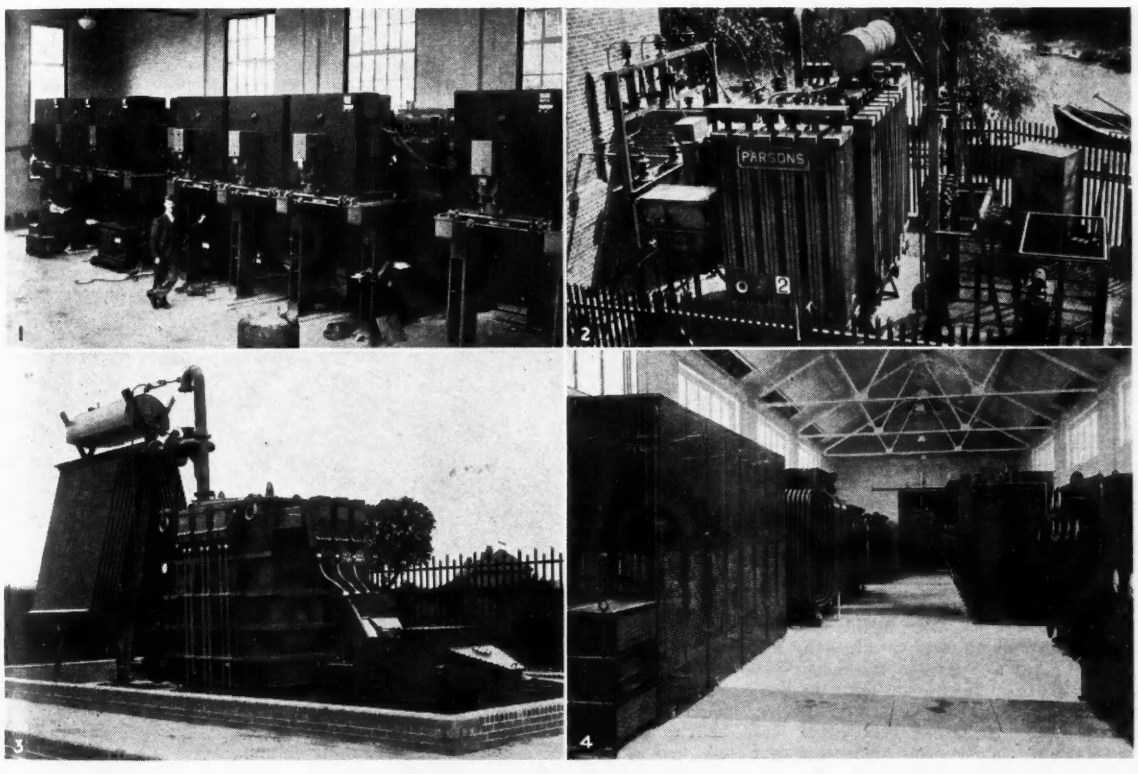
High-voltage Distribution at Derby

Inaugurating a 33-kV system

THE original scheme of linking up the undertaking of Derby Corporation to the grid was by means of two 33-kV overhead lines running from the Central Electricity Board's transforming station at Spondon to Nottingham Road and thence underground to the Sowter Road sub-station of the undertaking, where the supply is transformed to 6.6 kV and connection made with its bus-bars.

In view of the proposal of the C.E.B. to reinforce its supply by two additional 33-kV feeders, each of 10,000-kW capacity, Mr. F. Nicholls, the borough electrical engineer, decided to take advantage of the opportunity to establish the beginning of a 33-kV system in his area. The £70,000 extension that was officially switched in last Friday is designed to meet the rapid expansion of demand for domestic and industrial supplies in the southern part of the borough.

The scheme comprises three main features: The reception of the grid supply at a switch-house near the generating station, a step-down installation at Allenton and the 33-kV cables between the two. An annexe to the main switch-house has been erected to accommodate ten 33-kV panels. These are of the compound-filled horizontal draw-out metal-clad type with double bus-bars. The 750,000-kVA round-tank circuit-breakers, solenoid-operated and fitted with explosion pots and interlocks, control three grid and two outgoing feeders, the others being bus-section and bus-coupler switches with one spare panel. They are operated from sheet-steel bench-type control panels



Points on the Derby distribution system

1. The switchgear annexe, Full Street, showing 33-kV equipment. 2. Transformer (33/6.6-kV) at Sowter Road sub-station. 3. Hackbridge 10,000-kVA transformer and cooler and Ferguson Pailin oil-immersed isolator at Allenton. 4. Interior of Allenton sub-station showing switchgear and Hewittic rectifier

in the turbine house. On these are installed all control relays, instruments, indicators and semaphores showing the position of selectors and breakers.

The scheme has allowed for the taking over from the Central Board of the two natural-cooled 10,000-kVA transformers of the grid supply which has now been transferred direct to the Corporation's 33-kV bus-bars. This has entailed the removal of the cable connections on the 33-kV side of the transformers and straight-jointing them to new cables laid along the river-side to the new switch annexe and also the coupling of the transformers to the 33-kV switchgear. Zig-zag wound neutral-point earthing transformers with limiting resistances have been accommodated adjacent to the main transformers. An extra feeder from the grid was connected and a further cable laid in the river for a grid feeder at a later date.

Transmission to Allenton is through two 0.25 H-type, p.i., l.c., s.w.a. cables with screened cores laid at an average depth of 3 ft. and covered by concrete slabs. There is also a 36-core pilot cable for feeder protection, tap-changing gear, temperature alarm and telephone.

These cables terminate in two non-automatic iron-clad oil-immersed isolators. Each of these controls a 10,000-kVA 33/11/6.6-kV O.N. transformer with separate oil coolers, and on-load tap-changing gear giving ± 10 per cent. in 1 per cent. steps, all mounted on anti-vibratory pads. Operation will be from the generating station in Full St. where are located the protection relays, voltmeters and temperature-alarm relays.

The 6.6-kV switchgear consists of a sixteen-panel board of the duplicate bus-bar component filled metal-clad type incorporating oil circuit-breakers of 250,000-kVA rupturing capacity. Two of these (1,200 A) are for the incoming transformers, ten (400 A) for feeders, and another is a bus-bar coupler 1,200 A). The remaining three control 1,000-kVA Scott-connected 6.6/2-kV transformers supplying a metal-clad two-phase 50,000-kVA switchboard comprising two d.p. transformer panels and ten s.p. feeder panels.

Two 500-A s.p hand-operated earthing switches with liquid earthing resistances are also installed for the lower voltage side of the incoming transformers. A rectifier unit for supplying the trolley-bus system includes a 600-kVA transformer, four 150-kW bulbs in parallel, three automatic circuit-breakers, and a main control panel.

The buildings were designed by the borough architect, Mr. C. H. Aslin, and built by the Corporation (Allenton sub-station by the Electricity Department). Main interconnecting and pilot cables were laid and jointed by the staff of the Electricity Department under the supervision of the borough electrical engineer.

Switchgear and equipment were installed by the manufacturers, the principal of which were: The British Thomson-Houston Co., Ltd. (switchgear in main switchhouse); Ferguson, Pailin, Ltd. (switchgear in Allenton sub-station); C. A. Parsons & Co., Ltd. (grid-supply transformers); Hackbridge Electric Construction Co., Ltd. (transformers, including that for the rectifier, at Allenton sub-station); and Hewittic Electric Co., Ltd. (rectifier). In addition British Insulated Cables, Ltd., manufactured the transmission cables.

The switching-on ceremony was performed by Ald. A. Sturgess (chairman of the Electricity Committee), and among the guests was Mr. G. H. Lake, the former borough electrical engineer, now in charge of the Nottingham undertaking.

As an indication of the progress being made in Nottingham, the figures for the year ended March 31st last may be compared with those for six years earlier. During the intervening period the number of consumers has grown from under 20,000 to approximately 50,000, the total connections from 67,000 kW to 195,000 kW, the m.d. from 16,200 to 27,200, and the kWh sold from 34.8 million to 78.3 million. Six years ago there were 1,471 cookers in use compared with 12,269 last March, while the numbers of water heaters and wash boilers have increased from 161 and 144 to 2,660 and 3,372 respectively.

It is intended that the new 33-kV system should form a starting point from which distribution at that voltage can be carried into other districts as soon as the demand that is anticipated materialises. Full use will be made of arterial roads for the routes of further 33-kV feeders, thus obviating the breaking up of streets through the centre of the town.

Guglielmo Marconi

BY the death on Tuesday of Guglielmo Marconi the world has lost one whose pioneering work in radio development has profoundly influenced civilisation.

Marconi was born on April 25th, 1874, at Bologna. His father was an Italian, his mother a daughter of Mr. A. Jameson, of Wexford; to her he owed the encouragement that stimulated his youthful efforts. He was educated at Leghorn and at Bologna University. Early experiments in the application of Hertzian waves to the transmission of signals were conducted at his father's country house at Pontecchio, when he discovered that the use of relatively tall aerials in conjunction with earth connections effected a fundamental improvement. For detection he used the Branly and Lodge coherer, which he adapted.

In 1896 Marconi came to England. The main features of his investigations up to that time were described in a letter, dated November 14th, 1896, which he wrote to Sir William Preece, engineer-in-chief of the British Post Office. Sir William was at once interested and provided facilities for carrying out tests.

In the same year Marconi took out the first patent ever granted for wireless telegraphy based on the use of electric waves, giving demonstrations before officials of the Post Office and other representatives of British and foreign government departments of transmissions up to nine miles. In June, 1897, he went to Spezia at the invitation of the Italian Government and established communication with warships up to a distance of twelve miles.

The late Marchese Marconi

A company was formed in London in July, 1897, to acquire the Marconi patents in all countries except Italy, and in the following year wireless telegraphy was first used for commercial purposes, when the Kingstown Regatta races were reported by means of apparatus installed on a tug. Wireless apparatus was also installed on the East Goodwin lightship for communicating with the South Foreland lighthouse twelve miles away. The first communication between England and France (South Foreland to Wimereux) followed in the next year, when wireless was used also in naval manœuvres over distances of seventy-four miles, coupling being introduced between the aerial and detector circuits.

In 1900 a patent was taken out (No. 7777) for "tuned or syntonic telegraphy," by which time signals had been transmitted to points more than 200 miles distant, supporting Marconi's view (contrary to that held by many) that the curvature of the earth's surface would not prove to be a bar to long-range working. These results led Marconi to erect a station at Poldhu, Cornwall, from which he reported receiving signals at St. John's, Newfoundland, 1,800 miles away, on December 12th, 1901, and some months later readable messages on a liner at distances up to 2,000 miles.

A practical form of magnetic detector was substituted for the coherer in 1902 and the horizontal directional aerial was patented in 1905. These were used in the station at Clifden in Ireland, which was put into commission in 1907, and which enabled Marconi, with the assistance of Mr. H. J. Round, to transmit signals to Buenos Aires in 1910. Two years later Marconi devised the "timed-spark" system of generating continuous waves, by means of which the first messages were sent from England to Australia on September 22nd, 1918.

Simultaneously, from 1916 onwards, Marconi had been interesting himself in Italy in the potentialities of very short waves—a subject in which he showed the keenest interest right up to the last. These investigations were made practicable by the invention of the thermionic valve by Sir J. A. Fleming (who had described it in 1904). Later in England, with the assistance of Mr. C. S. Franklin, Marconi transmitted very short waves over increasing distances and also at increasing frequencies with a view to lessening the effect of daylight. The result was the establishment of short-wave beam stations throughout the Empire.

Honours were conferred on him in many lands. In Italy, among numerous other distinctions, he received the hereditary title of Marchese in 1929. In Britain he received the Grand Cross of the Victorian Order, honorary degrees from the principal universities, the Nobel Prize for Physics, the Albert Medal of the Royal Society of Arts and the Rectorship of St. Andrews. He was elected, in 1926, an honorary member of the Institution of Electrical Engineers, of which he was a member for thirty-nine years and an ordinary Member of Council for a period, and he was a recipient of the Kelvin Medal.

Insulating Tapes

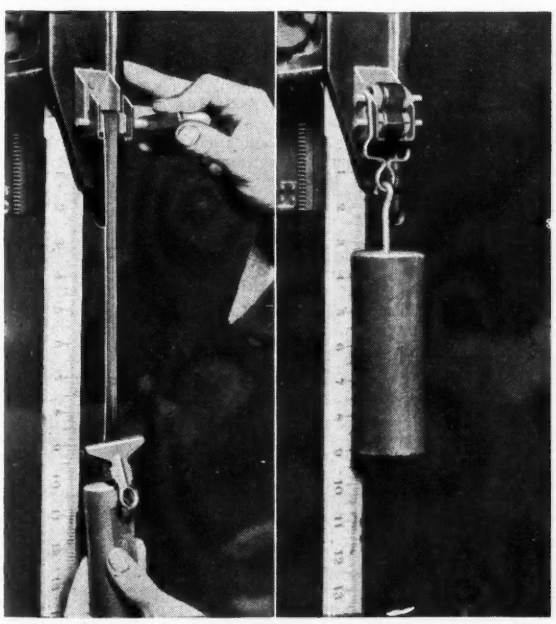
Tests for dielectric strength and adhesion

THE common usage of insulating tapes in so many branches of the electrical industry is chiefly due to the simple method of their application, but serviceability is also important. A good black adhesive insulating tape is of medium thickness, the rubber compound being thoroughly keyed into the fabric under friction calender pressure so that it cannot be pulled away and thus leave bare spots when adjacent layers are separated. The Government specifications require the tensile strength to be 40 lb. per in. of width, but Rotunda, Ltd., to whom we owe the following notes, informs us that successive tensile tests show the strength of its tape to be never less than 45 lb. per in. Lack of tensile strength means breakages and waste. It is essential that the adhesive and insulating properties shall still remain even after the tape has been in service for an extended period, and a two years' guarantee is obtainable. Tests for dielectric properties and tackiness and adhesion are made in the following manner:

Test for adhesive quality

For determining adhesion a sample, usually 24 in. long, is removed from the roll and wound upon a mandrel 1 in. in diameter under a tension of 10 lb. per in. of width at a uniform rate of 30 in. per min. The tape is allowed to stand for three min. with the 10-lb. weight attached, after which a weight of 4 lb. per in. of width is substituted and the tape allowed to unwind. Government specifications call for a rate of unwinding of not more than 20 in. per min., but the best quality unwinds at a rate of 7 to 9 in.

The tackiness of ordinary insulating tape can be simply determined by flipping the surfaces of the tape into contact and judging the effort required to pull them apart. The average buyer takes a roll of tape and presses one layer on top of another to see how sticky it may be. Such tests mean little because real adhesion and stickiness are entirely different. A poor tape is often too sticky to adhere properly, whilst a good tape will require an effort to pull its surfaces apart after they have been only lightly flipped together.



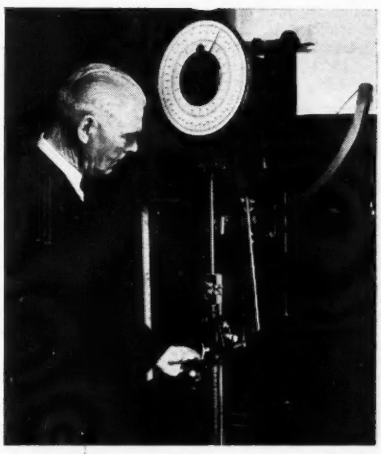
Rubber tape wound on mandrel under tension and (right) mandrels pressed together

The dielectric test is made by placing one thickness of tape between two electrodes and measuring the voltage necessary to puncture it. The ordinary operating maximum is about 500 V, but Government specifications are considerably in excess of 1,000 V.

The final tests is the pinhole test, in which a length of 6 in. of the tape is held over a slot in an illuminated box using a 30-W lamp and the number of pinholes are counted. Government specifications allow two pinholes per yd. of ¾-in. width and pro rata for other widths.

A dry handling rubber insulating tape known as splicing compound, extensively used in America for jointing and repairs, including high-voltage work, is now manufactured in England by the same concern. As successive layers are lapped around a conductor the layers mould into a solid yet flexible insulation without any other treatment, in contrast with methods of jointing in which the conductor is first lapped with pure rubber tape and finally with a vulcanised rubber tape.

It is claimed that the insulation of a joint made with splicing compound and covered with adhesive insulating tape or pitch and bitumen tape for mechanical protection is comparable in properties with the insulation and braid of the original cable. The stretchable character of this rubber tape enables it to be used on irregular shaped joints and connectors forming a closely fitting one-piece jacket. It is tested for dielectric properties in the same way as adhesive insulating tape, but tests for adhesion are made on a special apparatus. Each of two small cylindrical mandrels cut flat on one side are first wound with four layers of the tape stretched to three times its original length and wound on under the tension of a definite weight. Then the two flattened sides are pressed together, under a specified load and for a specified time. Following this they are removed to a tensile testing machine, and the force required to pull them apart is taken as a measure of their fusion.



Wound rubber tape in tensile testing machine to measure separating force

Splicing compound is tested for tackiness by winding it under tension on a mandrel to three times its length. When the tension is released there should be no signs of the layers unwinding.

The photographs reproduced with this article were taken in the Bell Telephone Laboratories.

Barnes and the Brighton Convention

The experience of a Barnes alderman who complained that he was "shouted down" at the I.M.E.A. Convention at Brighton last month had a sequel at the monthly meeting of the Barnes Town Council on July 14th, when the alderman made a report. The discussion arose upon the minutes of the Fire Brigade and Lighting Committee, which were as follows:—"Alderman E. Middleton reported (1) that he had attended the annual general meeting of the Incorporated Municipal Electrical Association at Brighton as one of the Council's delegates and had moved the motion as to the venue and a reduction in the length of future annual general meetings of this Association which had been placed on the agenda pursuant to a resolution of the Council; (2) that the motion was not carried; and (3) that owing to interruptions at the meeting during the moving of the motion he felt it had not been given fair consideration." The Committee resolved:—"That this Council, being a member of the Incorporated Municipal Electrical Association, declare their rights to have a motion introduced by their accredited representative at the Association's annual general meeting, and calls the attention of the Council of the Incorporated Municipal Electrical Association to the fact that such right was not accorded to Barnes by the meeting at Brighton on June 4th last." After a lengthy discussion the resolution was carried.

Parliamentary News (BY OUR SPECIAL REPORTER)

Naval Ratings for Power Stations

On July 14th Mr. Parker asked the Minister of Transport whether he would inquire from the Electricity Commissioners by whose authority a letter was sent on June 8th, 1937, from "Sub-committee E" of the Electricity Commission to the heads of electricity supply undertakings in the London area asking for the number of naval ratings and volunteers required to maintain essential services in the event of a strike or other emergency.

Mr. Burgin said that this inquiry was made of all owners of large generating stations in the London area as part of the ordinary routine for periodically bringing up to date the information necessary to ensure continuity of this essential service in times of emergency.

L.N.E.R. Electrification

On the same day Mr. Parker asked the Minister of Transport whether the schemes for electrification and improvement of the suburban services out of Liverpool Street were to be proceeded with or postponed; and, if the latter, for what reason and for how long.

Mr. Burgin said that he was informed that it was the intention of the Standing Joint Committee of the London Passenger Transport Board and the Main Line Railway Companies to proceed with the schemes for the electrification and improvement of the suburban services out of Liverpool Street station as already announced.

Interference with Broadcasting

On July 19th Sir T. Moore asked the Postmaster-General if he was now in a position to give a definite undertaking that legislation to implement the report of the I.E.E. Committee with regard to electrical interference with broadcast reception would be introduced in the near future.

Major Tryon said that the preparation of a Bill to give general effect to the recommendations of the Committee on Electrical Interference with Broadcasting was under consideration. The matter was being actively pursued, but he could hold out no hope of a Bill during the present session.

Transatlantic Telephone Calls

Replying to Mr. Day, Major Tryon said that the number of telephone calls made between this country and the United States during the three months ended May 31st last was 5,511, and the average duration of the calls was about seven minutes. The last negotiations concerning the transatlantic telephone rates resulted a year ago in a reduction of the rate to the New York zone of the United States from 40s. to 28s. a minute during the day, and from 28s. to 20s. a minute at night and on Sundays. Similar reductions were made in the rates to the more remote zones and the charge for calls to ships on the Atlantic set up via New York was reduced from 48s. to 36s. a minute. Some further reductions were made at the beginning of this month in the charges for calls to places beyond the New York zone.

In the Courts

Gas Rings on Electric Cookers

In the Chancery Division on July 15th Mr. Justice Farwell heard an action brought by the Egham and Staines Electricity Co., Ltd., against the Gas Light & Coke Co., Ltd., for injunctions to restrain the defendant company, its servants and agents from procuring or inciting any persons who had entered into agreements with the plaintiffs for the hire of electric cookers to permit the affixing to these electric cookers of apparatus known as the "Calthorpe hot-plate" or any similar apparatus in breach of the said agreements; a declaration that the affixing of the "Calthorpe hot-plate" to electric cookers at certain consumers' houses or elsewhere constituted a breach of Regulation 25 of the Electricity Supply Regulations, 1934; and damages for procuring breach of contract and other relief.

Sir Walter Monckton, K.C., for the plaintiffs, said that his clients let their electric cookers on hire and the agreement provided that no alteration or addition should be made to the cooker without the previous written consent of the plaintiffs. The plaintiffs had not given their consent to any alterations or additions to their cookers, and their complaint was that the defendants had induced consumers to break their agreements by allowing the super-imposition or attachment of a gas hot-plate. Defendants, when written to, denied that any attachment made by them was a breach of the agreement of hiring. The plaintiffs further alleged that the attachment of the hot-plate to their cookers prevented the maintenance of the electric cooker in a safe condition. The defendants had refused to give any undertaking in the matter.

The defence was a denial that the terms and conditions on which the plaintiffs supplied electric cookers on hire were known to them at any time material in these proceedings. Defendants admitted that they had supplied gas hot-plates to six persons but denied that they had induced any consumer of plaintiffs' to break any agreement. They also denied that the attachment of the hot-plates to the electric cookers prevented the maintenance of the cookers in a safe condition or that the plaintiffs had suffered any damage.

Sir Walter Monckton, proceeding, said the defendants had affixed two styles of hot-plates to plaintiffs' cookers, and plaintiffs said that the attachment in question was likely to cause damage to the cooker itself and constituted a potential source of danger. Between June, 1935, and July, 1936, the defendants had distributed some 250 circulars urging the use of gas hot-plates, but they ceased the distribution in August, 1936. So far the defendants had supplied 56 gas hot-plates.

Evidence was then called in support of the plaintiffs' case.

Mr. H. W. Spring Smyth, an electrical engineer with the Metropolitan Electric Supply Co., examined, said it was common knowledge among electrical engineers that gas pipes and electrical conductors should be kept remote from one another. Cross-examined by Mr. Miller, who suggested that housewives found electrical apparatus very slow in heating up as compared with gas, witness replied "Some people say they are slow, some say they are not."

On July 16th Mr. John Franklin Shipley, consulting electrical engineer, demonstrated to the court the arrangement on an electric cooker for earthing the grill and rest of the apparatus, and said that the proximity of gas pipes to the electric apparatus was invariably condemned. In his opinion the use of a gas hot-plate on an electric cooker was dangerous. Mr. Miller challenged that suggestion.

Witness said that all highly technical combinations of electricity and gas, such as was the case at the Dorchester Hotel, were controlled by skilled engineers.

Mr. Gordon Mason, chief engineer to the Revo Electric Co. which manufactures cookers for the plaintiffs, said he regarded as unsafe the use of a gas hot-plate on an electric cooker and it was bad for the cooker. He deprecated the use of asbestos mats on electric cookers as they tended to keep the heat in and raise the temperature of the cooker. With a mat an electric cooker might rise to a temperature of nearly 700 deg. and that would mean early destruction.

Mrs. Lily M. Neale, of Greenford, said she had an electric cooker and that a representative of the Gas Co. had called and offered her a hot-plate free. She had it placed on the table on the left of the cooker, the flexible gas tubing passing at the rear of the cooker. In June last, when she had the oven and one hot-plate of the electric cooker switched on, she turned on the second hot-plate; there was a loud explosion and sparks behind the stove. A week later, when again she went to turn the second hot-plate of the cooker on, there was a loud explosion and the gas tubing caught alight. She turned off the gas and electric current and reported the matter to the Electricity Co.

Mrs. Eva Hunt, of Hayes, said she had an electric cooker. When the defendants' representative called she had a hot-plate from them, and, later, she had replaced that by a gas ring.

Other evidence having been given, the plaintiffs' case closed.

Mr. Miller, in opening the defendants' case, said that the truth of the matter was that the plaintiffs found themselves exposed to the facilities offered by the Gas Co. in giving gas by the use of hot-plates. His submission was that there was no substance in the plaintiffs' complaints at all. The Gas Co. was conscious of the fact that it was a public utility company and had certain duties to perform. It was the Gas Co.'s view that the housewife had a right to have electricity or gas, or both, at her own option. But this action, if it succeeded, would have the result that people who were committed to the plaintiffs would be prevented from taking a subsidiary service which they desired and found more convenient.

The "Calthorpe" was back history, and the Gas Co. had found a better and more efficient apparatus in the "Argyle." He contended that the Gas Co. had done nothing to knowingly induce a breach of contract by the plaintiffs' customers. If necessary, the Gas Co. would give an undertaking that no more "Calthorpes" should be issued in the Egham district: the "Argyles" would in future be issued. There was no ground for saying that anything the defendants did was an alteration or addition to the electric cooker.

On Monday Mr. Miller, in concluding his address on behalf of the defendants, submitted that the plaintiffs had produced no evidence that the defendants had induced any of the plaintiffs' customers to break their contracts.

Mr. R. W. Foot, general manager of the defendant company, said it was his experience that many consumers desired to have both gas and electric cookers. It was open to the defendant company when a person had an electric cooker to decline to supply an ancillary apparatus. He did not know the terms of the plaintiffs' supply contracts until he got the information from them. He said that on June 18th, he knew that the plaintiff company had an agreement with its consumers to the effect that such consumers would neither make nor allow any alteration nor additions to the electric cooker without the written consent of the plaintiff company. He agreed that if the "Calthorpe" apparatus was put on an electric cooker it would, or might, put the electric hot-plate out of play. The "Argyle" was not designed to put on an electric cooker. It had been advertised for use in conjunction

Correspondence

Contributions from readers are welcomed. The writer should give his name and address, not necessarily for publication

Transformer Protection

Would any of your readers suggest an economical protection for the high-voltage side of the following transformer?

A 100-kVA single-phase lighting transformer, having a ratio of 6,600-230 V, is to be connected to the 6,600-V substation bus-bar. In case of a short-circuit in the transformer the fault kVA may be as high as 150,000 at 6,600 V, and the cost of a circuit-breaker having an equivalent interrupting capacity would be rather high.

I was considering a less expensive proposition, say an oil-immersed switch fuse, but the manufacturers' catalogues that I have do not list fuses of such high interrupting capacity. It was suggested to me to have a current-limiting resistance before the fuses to reduce their rating, but does that not mean added complication and a potential source of trouble? A reactor in the bus-bar is also not practicable.

P. K. BHATTACHARYA.

Jamshedpur, *July 7th.*

The Absorption-type Refrigerator

As leading makers of the absorption type of refrigerator, we would like to offer a few comments on the I.M.E.A. paper on "Domestic Refrigeration" by Messrs. W. F. T. Pinkney and A. J. Ryan, dealt with in your issue of June 4th.

We feel that the authors have been a little misleading in their statement regarding summer current. A compressor machine will only produce cold when the motor is running. Therefore, a compressor machine will use its current at the hottest time of the day when the refrigerator is being mostly used, and not much current will be used at night time. We suggest that instead of the load being "staggered" almost the whole of the machines would be operating together. Further, as the temperature in a kitchen is almost as high (perhaps higher) in the winter and refrigerators are in general use all the year round the question of "peak load" must be considered.

The above working arrangement is applicable to all compressor machines, but in the case of the "Zeros" refrigerator (Normelli system) times of consumption are predetermined so that the diversity factor obtained can be the maximum possible.

We must differ when it is claimed that the absorption type of refrigerator has a smaller reserve capacity for overloads and a temperature variation that is not uniform. In the case of the Normelli system cold is being produced almost continuously. This cold production is accumulated in a tank of frozen solution, which ensures a reserve to meet any reasonable demand.

For the past seven years the Normelli system has been employed by some of the better-known electrical concerns on the Continent, including Siemens Schuckert, of Berlin.

At 1d. per kWh the difference in running cost is 14s. 3d. per year, but as the actual average price of current is ⅝d. the difference is only 9s. per year.

The authors have not been quite fair to the absorption type by not pointing out the many advantages as against the extra cost of running, particularly the saving in service costs. The average running time of a compressor as given by the authors is 2,000 hours per year, and thus it suffers considerable depreciation. In the absorption type there are no moving parts whatsoever. It is absolutely silent and causes no radio interference.

Both the user and the supply undertaking benefit from the absorption-type refrigerator; the user saves money on service and the supply undertaking sells not only more electricity, but sells it at the most convenient time. Supply undertakings can offer our refrigerators at as low as 1s. 6d. per week, which is a really adequate reply to gas competition.

ZEROS (SALES), LTD.,
G. JEFFCOCK,
Sales Manager.

Dagenham, Essex, *July 13th.*

Electricity Supply to Rural Areas

The question of rural supplies is one which is commanding a good deal of attention, consequent on the advent of the "White Paper" proposals. I have been present at various meetings called to consider the question of rural supplies, but the subject does not lend itself to mass suggestion and thus far little out of the ordinary has emerged. Having regard to the nature of the "White Paper" it is essential that thinking should proceed along rational as well as national lines.

So far as rural supplies are concerned, electricity supply authorities and their industry have been likened to the "House that Jack Built," but the same is equally true of agriculture. According to the "White Paper," nothing short of large-scale amalgamations and compulsory absorptions can put the electric house of the future in order and enable rural supplies to be given on the desired scale. But if large-scale amalgamations are going to work such wonders for the supply industry then a similar measure of compulsion in the matter of amalgamating small farms into a large-scale single unit ought to work similar wonders for agriculture, and thus affect the question of rural supplies. Seeing that it has seemed such a simple matter for the Minister of Transport to group undertakings so that the majority of the small ones would be absorbed by a single large undertaking it ought not to be difficult for the Minister of Agriculture to draw up a similar bunch of proposals whereby all farms of less than, say, 10,000 acres would be compelled to sell out to the larger neighbours for the common good.

The idea of a high-voltage supply to such a well-organised countryside comprising a single farm instead of having to afford low-voltage supplies to something like 200 farms and cottages is likely to appeal to the majority of engineers, but perhaps it would be more dangerous politics to attempt to force such a scheme on individual farmers than is the case with a few hundred supply authorities.

JAMES RATCLIFFE,
Engineer and Manager,
U.D.C. Electricity Department.

Whitworth (Lancs), *July 16th.*

In the Courts (*Continued from previous page*)

with electric cookers. He was not prepared to undertake that the "Argyle" would not be used again in this district in connection with an electric cooker.

At the conclusion of the evidence of Mr. Foot, Mr. Miller submitted that the plaintiffs had wholly failed to make out a case.

Sir Walter Monckton, replying on behalf the plaintiffs, submitted that the plaintiffs had proved that what the defendants had done was an invasion of their rights and that they were entitled to the injunction and the relief which they claimed.

In giving judgment, Mr. Justice Farwell said that to meet the needs of people who liked to have both gas and electricity in their homes the defendant company had put on the market a gas hot-plate which fitted conveniently on the top of an electric cooker and many consumers had had it fitted. The plaintiff company's consumers agreed not to alter or add to their electric cookers, but it bordered on the ridiculous to say that the "Argyle" hot-plate which merely stood on the cooker was an addition to or alteration of the cooker.

Consequently there was no breach of contract by any of the plaintiff company's customers and no wrongful inducement of a breach of contract by the defendant company, and the action must be dismissed with costs, the defendant company having undertaken not to supply any more "Calthorpe" hot-plates.

Alleged Fraud on Creditors

After a hearing lasting six days the trial was concluded at the Manchester Assizes last week of the case against Jack Smith Gorman, traveller, Hugh Thornton, accountant, and Charles Hodge, accountant, who were charged with conspiracy to defraud and with failing to keep proper books of account. Gorman was separately charged with carrying on the business of the Commercial Engineering Co., Ltd., at Nelson, with intent to defraud, and the two other defendants were accused of aiding and abetting. There were further counts in the indictment against Gorman which alleged that he had obtained property on credit by false representations. All the defendants denied the charges.

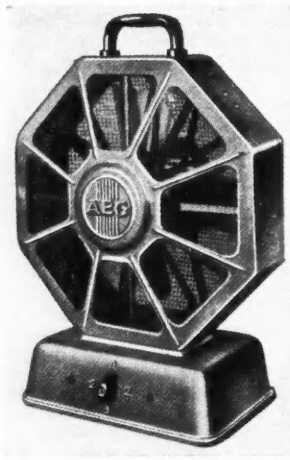
The case for the prosecution was that the defendants conspired to swell by credit buying the stock of the Commercial Engineering Co., Ltd., when they knew that the concern was hopelessly insolvent so that Gorman, who held a debenture for £500, could put in a receiver. Gorman was the managing director of the company, Thornton acted as secretary, whilst Hodge was the auditor. It was alleged that goods to the value of more than £1,000 were obtained on credit and were not paid for. In February, 1936, Gorman as the debenture holder put in a receiver.

The defendants denied the charges, but after a retirement of more than two hours the jury found all the defendants guilty. They were given good characters by the police. The Judge sentenced Gorman and Thornton to nine months each in the second division and Hodge to three months in the second division. The Judge pointed out that up to July, 1935, Gorman had carried on business in a perfectly proper way. His Lordship added that he thought Thornton was the cause of all the trouble. He had helped Gorman to commit fraud on his creditors.

New Apparatus and Devices

for Domestic, Cooking and Heating, Lighting, Power and Scientific Purposes

Combined Fans and Heaters



The A.E.G. fan-heater

The electric fan-heater is a useful means of providing a quick heat throughout a room or of warming odd corners. The A.E.G. ELECTRIC CO., LTD., 131, Victoria Street, Westminster, S.W.1, is introducing a new model, which, while moderately priced, is stoutly constructed and well finished in either mahogany or ivory.

The heater comprises a series of radially mounted elements behind which is fitted a quietly running fan driven by an induction type motor causing no radio interference. A four-way rotary switch permits the fan only to be used if no heat is required.

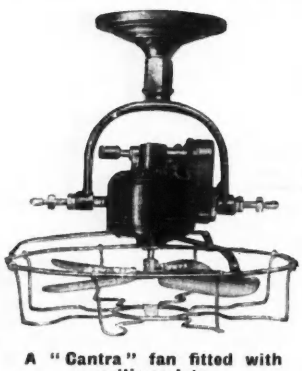
The standard loading is 1,500 W (fan 20 W), but lower loadings of 500, 700 and 1,000 W are available, these being especially applicable to shop window use for preventing misting. Close mesh wire screens back and front protect the elements and fan.

Heat Insulation

The use of air imprisoned within fibres of lava kapok is the basis of "Tropal," heat-insulating material with a thermal conductivity as low as 0.23 B.th.u per cu. ft. per hr. for 1-in. thickness and 1 deg. F. difference in temperature—as certified by the National Physical Laboratory on a sample submitted for test. Its density is 3 lb. per cu. ft. (about one-sixth that of cork), and it is claimed to be non-hygroscopic and vermin-proof. "Tropal" is obtainable in sheets of a thickness ranging from ¼ in. to 6 in. from AIRPACK, LTD., 21, Cockspur Street, S.W.1.

Oscillating Ceiling Fans

Several new types of "Cantra" fan have been introduced by MARELLI & CO., LTD., Artillery House, Artillery Row, Victoria Street, London, S.W.1.



A "Cantra" fan fitted with ceiling plate

They are made in 12- and 16-in. diameters in both the oscillating ceiling and bracket types, being modified designs based on the O30 and O40 fans. The motor is of the four-pole induction type, series wound, for a.c., and two-pole for d.c., which is slightly cheaper. No slipping clutch and stopping mechanism are considered necessary. Normally only one fixed arc of oscillation is provided, but arrangements can be made to enable two or three definite arcs to be obtained, through which the fan moves.

The motor is mounted in a special cradle by means of two pivot studs, the latter being hollow and fitted with two grease cups. For either ceiling or bulkhead mounting in ships' cabins a shoe back-plate and locknut are fitted.

A special application of this fan is in cotton mills where it can be installed in a special cradle attachment permitting orientation above the creels or warping frames.

Ascertaining Calorific Values

The Griffin-Sutton bomb calorimeter has recently been improved in certain respects. In its present form rubber washers form the joint sealing the apparatus, these having taken the place of lead washers as formerly used for resisting an internal pressure of 25 atm. No spanners or bench fittings are required for closing. The washers are compressed and expanded laterally into contact with the walls of the bomb by the pressure of the oxygen used to support combustion.

Other features include a Sutton thermometer designed to eliminate "stiction," a means of making the electrical connections which avoids loose leads, a stirring arrangement for promoting thorough circulation of water round the bomb to secure rapid establishment of thermal equilibrium and a low water equivalent for the calorimetric system. The last tends to produce a high temperature rise and to give more accurate determinations. The calorimeter is marketed by GRIFFIN & TATLOCK, LTD., Kemble Street, Kingsway, London, W.C.2.

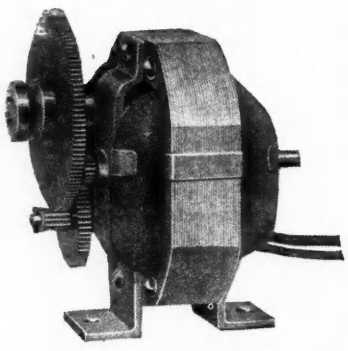
A "Safety" Kettle

The new 3-pint "Crown Merton 511" electric kettle, made by CORFIELD-SIGG, LTD., Trafalgar Works, Merton Abbey, London, S.W.19, is fitted with an automatic bi-metal cut-out and a new type of tubular immersion element. It has a seamless aluminium body with a bakelite steel-cored heat-proof handle, a welded spout and riveted porcelain feet. The lid has a bakelite knob and two vents for steam. The loading is 950 W.

The "Crown Merton 511" kettle

Small Geared Motors

A 1/40 h.p. induction motor has been developed by L. WILKINSON, 204, Lower Addiscombe Road, Croydon. It is of the two-pole, single-phase shaded coil type with centre rotor construction. The laminations reduce the temperature rise considerably, and the coils are taped, dipped and baked.



A "Wilco" geared motor

The bearings are of bronze impregnated with graphite, and a cup holds wool packing which can be replenished with oil. The motor is subject to a 1,000-V ground test.

The torque in inch-pounds is 0.09, and the full load speed 2,300 r.p.m., when the loading is 24 W, the idle speed being 3,375 r.p.m. The weight is 1¼ lb., and the motor is suitable for driving fan blades up to 8 in. in diameter, and sign display and model mechanisms. It is available with 24:1 and 48:1 gearing, giving torques of 1½ and 2 in.-lb. respectively.

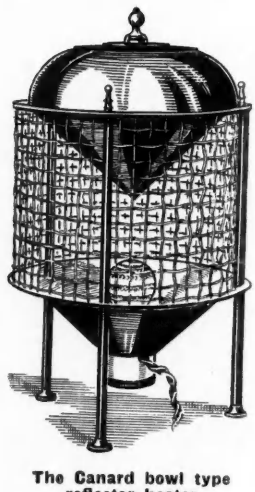
An Unusual Electric Heater

Details have been sent to us by L. CANARD & CO., General Estate Chambers, 136, Adderley Street, Cape Town, South Africa, of a new electric heater made in Australia for which it is desired to obtain a manufacturer in England on a royalty basis.

The principle of the invention is that heat is distributed over the entire room instead of being concentrated in one direction only, and a glow is spread around the top polished conical reflector.

The heat is directed from the lower reflector towards the top core in a circular beam, which is intercepted by an inverted conical cap and by this means diffused horizontally in all directions.

The loading ranges from 750 W to 2,000 W, and the heater can be made in three diameters, with 8 in., 10 in., or 12 in. reflectors. The height is 23 in. and the appliance has a florentine bronze finish.



The Canard bowl type reflector heater

British Overseas Electrical Trade

Exports continue to rise

EVIDENCE that the British electrical industry is not neglecting its overseas markets is contained in the Board of Trade returns for June. Exports of electrical goods and machinery again showed a very substantial advance over those of the corresponding month of 1936, being £433,773, or 40 per cent. greater. Apart from the total for April last the figure was the highest reached since 1930. Even the facts that Whit Monday fell in June last year and that prices have risen during the last twelve months do not discount this important rise. Imports, too, showed expansion though to a smaller extent—about 25 per cent. The total was somewhere about the monthly average for this year.

Our smaller table shows that there was only one exception to the tale of export increases; exports of motor starting and controlling gear were reduced. The greatest advance occurred in the case of insulated wires and cables which registered a rise of no less than 76 per cent. As will be seen from the following analyses, larger shipments to Australia were responsible for much of the increase, although other British countries also made larger purchases:—

Rubber insulated wires and cables:—South Africa, £37,322 (£21,874); British India, £17,781 (£11,707); Australia, £40,285 (£21,879); New Zealand, £4,328 (£5,176); other British countries, £25,772 (£10,634); and foreign countries, £24,145 (£6,975).

Wires and cables, insulation other than rubber:—South Africa, £36,421 (£21,499); British India, £22,178 (£14,047); Australia, £48,306 (£18,091); other British countries, £20,553 (£15,761); and foreign countries, £25,336 (£23,961).

The analysis of exports according to markets given in the larger table shows that so far as goods and apparatus were concerned Australia was a much larger buyer, her share having almost doubled as compared with June, 1936. South Africa's purchases were well maintained in this section, and taking the total of goods and machinery, the Union headed the list of importing countries with £251,835, against Australia's £232,847.

A noteworthy feature of these figures is an advance of about £22,000 in the value of shipments to China, although this was counterbalanced by a fall of over £20,000 in the amount taken by Argentina. France purchased twice as much electrical equipment from us in spite of the revaluation of the franc and there was an improvement in the majority of the other foreign markets.

EXPORTS AND IMPORTS DURING JUNE

	Exports. June, 1937.	Exports. Inc. or dec. compared with June, 1936.	Imports. June, 1937.	Imports. Inc. or dec. compared with June, 1936.
Submarine telegraph and telephone cables	£12,971	+ £12,379	*	—
Telegraph and telephone wires and cables (not submarine)	62,419	+ 12,979	*	—
Other insulated wires and cables	302,427	+ 131,095	£50,584	+ £22,759
Radio receivers, not radiograms (excluding valves)	20,347	+ 2,762	7,418	— 6,194
Radio transmitters (excluding valves)	26,996	+ 17,597	*	—
Radio valves	39,275	+ 15,115	13,561	+ 1,306
Other radio parts and accessories	52,025	+ 19,453	88,915	+ 20,199
Telegraph and telephone apparatus (other than radio)	167,143	+ 21,147	*	—
Electric carbons	*	—	12,191	+ 2,904
Incandescent lamps	52,173	+ 2,674	14,008	— 2,422
Other lighting apparatus	46,197	+ 7,768	50,339	+ 11,436
Primary batteries	13,589	+ 2,605	*	—
Accumulators	42,794	+ 16,200	*	—
Electric cooking and heating apparatus	25,078	+ 6,220	*	—
House service meters	15,864	+ 1,869	*	—
Other electrical instruments	19,901	+ 3,577	25,604	+ 5,476
Unenumerated electrical goods and apparatus	128,165	+ 9,388	78,859	+ 13,345
Electric generators up to 200 kW	32,555	+ 13,048	*	—
Electric generators over 200 kW	66,295	+ 20,805	*	—
Electric motors	136,507	+ 57,801	25,248	— 4,229
Convertors and transformers	62,357	+ 11,351	*	—
Starting and controlling gear for motors	37,056	— 9,479	*	—
Switchgear	111,018	+ 46,906	*	—
Other electrical machinery	16,832	+ 8,294	20,560	+ 6,798
Electric vacuum cleaners	25,325	+ 2,219	22,864	+ 9,555
Total	£1,515,309	+ £433,773	£410,151	+ £80,933

* Not classified separately. † Not railway and tramway motors.

Turning to imports, the smaller table shows that, as in the case of exports, cables were the item showing the largest rise, with radio apparatus a close second. Other sections exhibiting substantial increases were lighting equipment and vacuum cleaners. The following statement shows the origin of our imports and it will be seen that Germany replaced the United States at the head of the list with Belgium a close third:—

From British countries, £11,917 (£18,985); Germany, £91,596 (£64,895); Netherlands, £72,770 (£56,456); Belgium, £28,899 (£6,880); France, £7,926 (£6,911); Switzerland, £18,864 (£18,372); Austria, £3,969 (£3,397); United States, £80,226 (£66,373); other foreign countries, £25,312 (£30,401).

BRITISH ELECTRICAL EXPORTS DURING JUNE

Destination.	Goods and apparatus, June, 1937.	Inc. or dec. compared with June, 1936.	Electric generators, June, 1937.	Inc. or dec. compared with June, 1936.	Electric motors, June, 1937.	Inc. or dec. compared with June, 1936.	Other electrical machinery, June, 1937.	Inc. or dec. compared with June, 1936.
Irish Free State	£35,742	+ £10,116	*	—	*	—	*	—
Channel Islands	16,340	+ 7,412	*	—	*	—	*	—
Union of South Africa	160,382	+ 18,584	£6,033	— £5,441	£30,824	+ £15,726	£54,596	— £11,520
British India	101,009	+ 12,009	5,783	— 3,740	14,788	+ 5,760	38,941	+ 6,195
British Malaya	27,246	+ 8,897	*	—	*	—	8,210	+ 5,377
Ceylon	13,982	+ 8,462	*	—	*	—	*	—
Hong Kong	7,893	+ 2,337	*	—	*	—	*	—
Australia	191,260	+ 94,425	7,370	— 1,974	15,244	+ 5,091	18,973	+ 3,323
New Zealand	76,048	+ 27,718	*	—	4,901	+ 2,316	13,653	+ 6,077
Canada	15,944	+ 10,366	54,601	+ 53,899	5,588	+ 2,708	4,549	+ 3,719
Other British Countries	71,199	+ 26,525	9,025	— 7,408	20,610	+ 9,115	22,444	+ 8,230
Sweden	9,846	— 1,031	*	—	*	—	*	—
Denmark	20,900	+ 6,743	*	—	*	—	*	—
Netherlands	12,627	+ 2,321	*	—	*	—	9,633	+ 7,949
Belgium	9,882	+ 4,618	*	—	*	—	*	—
France	22,695	+ 11,469	*	—	*	—	3,876	+ 1,462
Portugal	15,580	+ 8,759	*	—	*	—	*	—
Spain	1,522	— 5,120	*	—	*	—	*	—
Italy	6,918	+ 6,030	*	—	*	—	*	—
Greece	5,895	+ 3,869	*	—	*	—	*	—
Rumania	3,302	— 3,069	*	—	*	—	*	—
Egypt	4,155	— 409	*	—	*	—	1,492	+ 832
China	28,043	+ 20,078	*	—	*	—	3,838	+ 1,875
Brazil	16,554	— 1,358	*	—	*	—	*	—
Argentina	40,564	— 22,088	*	—	*	—	2,543	+ 1,379
Other Foreign Countries	111,836	+ 25,165	16,038	— 1,483	44,552	+ 17,085	44,515	+ 22,174
Total	£1,027,364	+ £282,828	£98,850	+ £33,853	£136,507	+ £57,801	£227,263	+ £57,072

* Not classified separately.

One of the principal items in the export list is telegraph and telephone instruments and apparatus (other than radio) which made a further upward movement last month mainly due to the doubling of Australia's quota and despite a large decline in purchases by Argentina. The following figures show the distribution of these exports:—

Australia, £42,348 (£20,501); South Africa, £23,208 (£23,662); other British countries, £44,605 (£28,802); Argentina, £6,198 (£29,642); other foreign countries, £50,784 (£43,389).

Machinery exports made a very satisfactory showing, the increase in the total (including switch- and control gear) amounting to £148,726—about 47 per cent. The outstanding figure in this section was £54,601 in respect of shipments of generators to Canada which accounted for over a third of the increase, while exports to foreign countries showed a net increase of £51,273.

During the first half of this year the total value of electrical exports was £8,602,268, as compared with £7,113,266 in January-June, 1936, representing an increase of over 20 per cent. At the same time imports advanced from £1,962,359 to £2,379,650, or by over 21 per cent.

The increase in the volume of exports is indicated by the following figures:—Generators, from 2,378 to 3,655 tons; motors, from 4,055 to 5,149 tons; radio receiving sets, from 21,449 to 29,967; radio valves, from 515,080 to 810,629; and electric lamps, from 8,569,426 to 10,272,683. In spite of rises in value the volume was smaller in the cases of other electrical machinery and house service meters.

Business and Industrial Notes

The Week's News. Showrooms and Exhibitions. New Installations. Overseas Trade. Publicity Material. Trade Announcements. Prices of Materials. Liquidations and Bankruptcies.

Registered Electrical Contractors

At the last meeting of the Executive Committee of the National Register of Electrical Installation Contractors the following applications for registration were accepted :—

Central Electrical Engineering Co., Hull.
Sexton, C. E., Tonbridge.
Webster, A., & Sons (Burnley), Ltd., Burnley.
Malpass, J., & Sons, Cheadle Heath, Stockport.
Whyte & Young, Uddingston, near Glasgow.
Hadwin, R., & Son, Kendal.
Hawkins & Moss, Harrogate.
Jones, E. N., & Son, Wrexham.
Glover, E. & H., Darlington.
Tait, H. A., Edinburgh.
Electrical & Mechanical Service Co., Ramsbottom, near Manchester.
Smith, R., Edinburgh.
Gornall, H. J., & Co., Shrewsbury.
Holt, A. J., & Co., Ltd., Harlesden, N.W.10.
Evans, S. A., & Co., Southsea, Portsmouth.

At the same meeting seven applications were declined.

Works Extensions

The large amount of work on hand for Revo products has made it necessary for the Revo Electric Co., Ltd., to extend several departments. An extension to the company's cooker factory measures 204 ft. by 160 ft. (plus 30 ft. for lavatories), which will make this factory 834 ft. in length. A new factory for the manufacture of switchgear and fans is now being completed, which will be 300 ft. long by 190 ft. wide. A new bay is being added to the vitreous enamelling department (156 ft. long by 40 ft. wide), while the three existing 40 ft. wide No. 2 foundry bays are being extended by a further 40 ft., and an entirely new bay 246 ft. by 40 ft. wide is being added alongside. Additions are also being made to the woodworking department, which will include a new bay 170 ft. long by 40 ft. wide.

Local Exhibition

An exhibition of electrical fittings and appliances, organised by the East Anglian Electric Supply Co., Ltd., was opened recently in the Public Hall, Thetford, by the Mayor (Sir William Gentle), supported by other members of the Corporation. The exhibition included talks by Mr. S. Watson on the uses of electricity in the home and a sketch entitled "The Watts Come to Stay."

An Electric Service Van

The accompanying illustration shows the latest electric service and delivery van put into service by the Alderley Edge and Wilmslow Electricity Board. This is a "CLW5" Wilson vehicle with a 60-V "Exide Ironclad" type "IMV5" battery, and a body designed to the specification of Mr. C. Cameron Kirby, the engineer and manager to the Board. The vehicle is capable of a speed of 25 m.p.h. on the level. The principal use of this vehicle apart from delivering meters to consumers' premises in the morning is to deliver and service electric cookers, water heaters and other hired appliances. Mr. Kirby

The new service and delivery van of the Alderley Edge and Wilmslow Electricity Board

states that the Board now has over a thousand electric cookers and about 400 water heaters connected to the mains, and the vehicle is proving of considerable use.

Wages in the Engineering Industry

The National Federation of Engineering and Allied Employers and the trade unions connected with the engineering industry have reached a provisional agreement regarding a claim for a general increase in wages and other improvements in employment conditions. A mutual recommendation is to be submitted to the constituents of both parties.

The Kent County Show

Considerable interest was aroused at the Kent County Show, held at Canterbury from July 14th to 16th, by the electrical exhibit arranged jointly by the electricity undertakings of Maidstone, Ashford, Canterbury, the County of London Electric Supply Co., Ltd., Folkestone, Isle of Thanet, the Kent

A corner of the electrical exhibit at the Kent County Show

Electric Power Co., Sevenoaks, the Weald Electricity Supply Co., Ltd., the South East Kent Electric Power Co., Ltd., Whitstable, Herne Bay and Faversham, and by the British Electrical Development Association. The stand had a total frontage of 120 ft., half of which was devoted to the display of agricultural machinery and equipment, the remainder being utilised for a kitchen, bathroom and general domestic display.

The Ironmongers and Electricity Reorganisation

At a recent meeting of the Birmingham and Midland Ironmongers' Association references were made to the electricity reorganisation proposals. According to the *Ironmonger*, Mr. H. Lugg said that there was a movement to split up Great Britain into sections so far as power distribution was concerned, which would result in the local authorities being swallowed up in the greater combines. If the local authorities were not going to sell the current or the apparatus it might prove to be the opportunity the ironmongers had been waiting for. Hence the need for the Electrical Section to keep a close watch on the progress of the movement. In reply to this, the president, Mr. E. B. Holloway, said that he thought the reverse of what Mr. Lugg had prophesied would be the case. There would be more and more selling by the distributor, and the supply companies would probably offer to service the apparatus. Members could rest assured that the Electrical Section was watching the matter closely.

E.D.A. Salesmanship Course

From a statement issued by the Director of E.D.A. (Mr. A. C. Cramb) last month, it appeared that the number of entrants for the E.D.A. Salesmanship course had reached the total of 1,228.

New Municipal Showrooms

The Burton-on-Trent Electricity Committee has approved plans by the electrical engineer for the erection of an electricity service centre consisting of showrooms, demonstration hall, &c., and a lecture room for the use of the Public Library and Town Hall Committee, at an approximate cost of £25,000, at the corner of Station Street and George Street.

Holidays with Pay

The Britannia Electric Lamp Works (1934), Ltd., is giving all its works staff who have been in its employ a year or more a week's holiday with full pay in appreciation of their loyal co-operation.

New Electric Vehicle Company

Associated Electric Vehicle Manufacturers, Ltd., the registration of which was recorded in our issue of November 20th last, has been formed to further the progress of the electric vehicle. It owns two leading electric vehicle manufacturing companies, namely, Electricars, Ltd., of Lawley Street, Birmingham, and A. E. Morrison & Sons, Ltd., of Leicester, the former being the makers of "Electricars" and the latter makers of "Morrison Electrics." The registered offices of all

these companies are at 231-3, Grand Buildings, Trafalgar Square, W.C.2 (telephone: Whitehall 4038/9). The managing director is Mr. E. H. A. Richardson, who is also a member of the boards of the two constituent companies.

German Radio Valve Prices

An average reduction of 20 per cent. in the prices of German radio valves was brought into force on July 15th. The four firms supplying the German market (Telefunken, the German Philips company, Loewe and Tungsram) have taken concerted action in the matter. The reduction applies to 47 of the 106 types of valves on the market. It is stated that the concession has been made possible by a reduction in production costs which has been effected in the past seven months by the co-operation of all concerned.

An Appeal for Scrap Iron

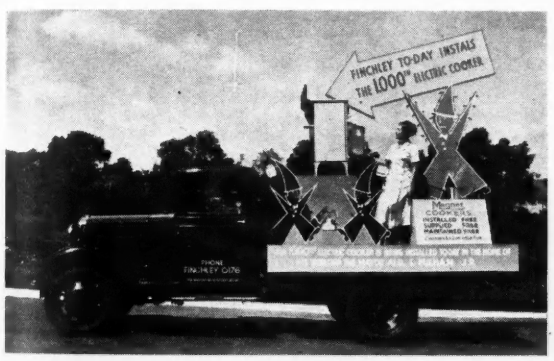
A luncheon in a scrapyard at Wood Lane, London, W., was given last Thursday week by G. Cohen, Sons & Co., Ltd. A marquee was erected amongst dumps of "old iron" and the appropriately worded menus were printed on sheet iron. Lord Dudley, who presided, read a message from Sir Thomas Inskip appealing for the full resources of the country to be used. Mr. Elliott, secretary of the British Iron and Steel Federation, proposed the agency firm's health and spoke of the work they had done to ease the steel-makers' position. Mr. Ward (Thos. Ward, Ltd.) said that 60 per cent. of the steel in this country was produced from scrap. Other speakers included Mr. Hale, president of the National Federation of Scrap Iron and Steel Merchants, Captain Leighton Davies (chairman of the Raw Materials Committee), Mr. L. Levy (chairman, G. Cohens) and Mr. Faulkner (editor, *Foundry Trade Journal*). The guests were subsequently conducted over Messrs. Cohen's machinery shops to view the reconditioning of electric motors, generating sets, and other work.

The Motor Show

The International Motor Exhibition will be held at the new Earls Court, London, from October 14th to 23rd.

Success of Finchley's Cooker Scheme

Within less than four months of the introduction of its "free" cooker scheme Finchley Corporation Electricity Department has installed its thousandth cooker—in the house of the Mayor. The accompanying picture shows a tableau arranged to commemorate this event. Excellent progress is also being made with regard to other appliances, and Mr. C. R. Westlake, the borough electrical engineer and manager, tells us that since the commencement of the new scheme on April



A decorated vehicle arranged to draw attention to the installation of the thousandth "free" electric cooker in Finchley

1st there have been installed 256 water heaters, 125 washboilers, 217 electric kettles and 122 radiators.

British Foundry School

The second annual general meeting of the British Foundry School will take place at 3 p.m. on July 27th, at the Education Offices, Margaret Street, Birmingham. All interested in the work of the School are invited to be present.

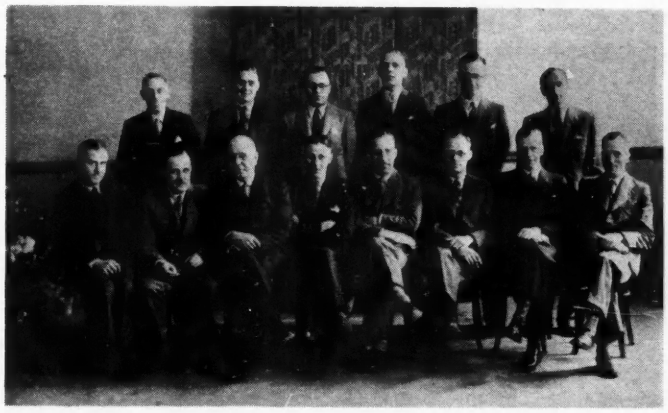
A Scottish Information Bureau

The Scottish Development Council's information bureau at 457, Strand, London, is to be officially opened to-day (Friday) by Lord Elgin, president of the Council.

Two Comprehensive Catalogues

Brown Brothers, Ltd., have sent us an 178-page illustrated catalogue of electrical equipment. The first 86 pages are devoted to wiring supplies for electrical contractors, consisting of cables, conduits, fuses, lamps, lampholders, switches, &c., and there is a useful selection of tools for the electrician. The next section details lighting fittings and a range of domestic appliances completes a comprehensive catalogue.

An illustrated catalogue of lighting accessories, cables and flexibles, conduits and fittings has been issued by Falk, Stadelmann & Co., Ltd. It is printed in blue and is well illustrated, the 170 pages being arranged to facilitate reference.



Bull Motors sales staff at a recent conference held at Ipswich

Reduction of Capital

A petition has been presented to the High Court for the confirmation of the reduction of the capital of the British Homophone Co., Ltd., from £500,000 to £200,402, and will be heard before Mr. Justice Crossman at the Royal Courts of Justice, Strand, on July 26th.

Hedge-trimming Appliances

We are informed that the illustration on page 53 of our July 9th issue shows the reciprocating and rotary types of hedge trimmer made by the Tarpen Engineering Co., Ltd., Balfour House, Finsbury Pavement, London, E.C.2.

Trade Announcements

Aerialite, Ltd., has removed its London depôt to 89, Charlotte Street, W.1.

An association has been made between the two old-established gear manufacturing firms of Henry Wallwork & Co. (1920), Ltd., and George Angus & Co., Ltd. With their combined resources, it is claimed, there is practically no limit to the dimensions or variety of work that can be produced.

J. & F. Stone Lighting & Radio, Ltd., has acquired premises in Oxford Street, London, consisting of six floors of showrooms. The building will be opened towards the end of August and an outstanding feature will be a television theatre where the most modern instruments will be on view. The company now has 110 branches.

The Birmingham offices of David Brown & Sons (Huddersfield), Ltd., are being moved to-day (Friday) to Prudential Buildings, Colmore Row (telephone: Colmore 4288).

Annual Holidays

The Willesden Works of London Transformer Products, Ltd., will be closed from July 31st to August 9th for the annual holidays.

Burton, Griffiths & Co., Ltd., are closing their offices from July 29th to August 9th.

The works of the Enfield Cable Works, Ltd., will be closed from July 31st until August 9th.

The British Thermostat Co.'s works will be closed from Friday evening, July 30th, until Monday morning, August 9th.

The Phosphor Bronze Co., Ltd., is closing its London and Birmingham foundries and works during the whole of Bank Holiday week.

The works of Salford Electrical Instruments, Ltd., will be closed for the annual holidays from July 30th to August 9th.

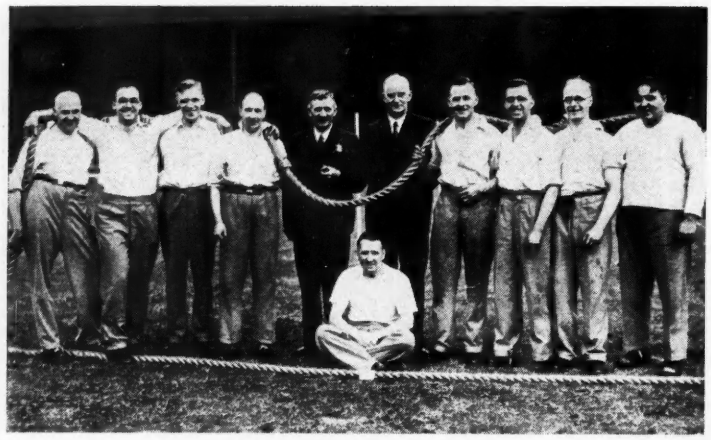
Electrification of Agriculture

In Mr. F. E. Rowland's article bearing this title in our last issue the amount given as the annual value of output in agriculture should have been £200 million—*not* £2,000 million. The figure $1\frac{1}{8}$ appearing in the calculation towards the end of the article should have been $\frac{1}{16}$.

A New Cable Factory

A cable making factory, the first in the North-East Coast area, was officially inaugurated by Lord Londonderry on July 14th, at Birtley (Co. Durham). It is owned by Durham Cables, Ltd., a concern formed last October with a capital of £30,000. The factory, with its site covers 80,000 sq. ft. There were present about 100 guests mainly representatives of other colliery, shipbuilding and general engineering firms in the North. By pressing a button Lord Londonderry set into motion the machinery and afterwards was conducted on a tour of inspection by Mr. H. C. Harrison, managing director of the company. The machinery installed includes heavy rubber mixers, calenders, extruding machines, stranders, braiders, lead extruding presses, tinning machines and vulcanisers so that, apart from the drawing of copper wire, the complete manufacture of cables can be carried out. All the machines

are driven by individual motors. The works will be in full swing within a few weeks, employing about 100 men and women. At the lunch which followed the opening ceremony, Mr. Norman Dawson (chairman, Durham Cables, Ltd.), said they had ample land for expansion and within the next few years might quadruple their capacity. Lord Londonderry, remarking that the present prosperity was stimulated by the Government's arms programme, wished the tremendous oscillation of boom and slump could be avoided. For the next four years Government orders would be the backbone of industry. After then he hoped industrialists would devise together some means of keeping the wheels of industry revolving by diverting their activities into other spheres. In addition to Mr. Harrison and Mr. Dawson the other directors of the company are Mr. W. C. Hay and Mr. W. Angus Wood. Mr. Harrison has had twenty-five years' experience as chief technical officer and works manager of a cable-making concern. The new factory will be concerned mainly with the making of lead-covered, tough-rubber-sheathed and vulcanised-rubber cables, including trailing cables, while it is also intended to manufacture corrosion and abrasion resisting compounds.



The successful tug-of-war team at the sports of the Automatic Telephone and Electric Co., and Elexcel, Ltd.

Lighting Fitting Showrooms

With the closing of their Newman Street premises, Harcourts, Ltd., have centralised their London organisation in Aldwych—the offices at Stanhope House, Kean Street, and the showrooms at Crown House. The latter have been rearranged to permit a more representative display of the company's wide range of lighting fittings without overcrowding and comprise a large main showroom with a smaller one leading from it, this being used principally for office, shop window and totally enclosed fittings. In the main showroom may be seen many of the coming season's designs, among which the semi-indirect fittings combining metal and coloured glass are especially attractive. Architectural lighting, a rapidly growing side of the company's business, is typified by indirect illumination emanating from the top of an ornamental pillar in the centre of the room, while a corner has been set aside for the display of table lamps. Pendants, floor standards, period fittings, wall brackets, ceiling fittings and "Heatlite" combined heating and lighting units have their place, and there is a special range of decorative units for small flats. Two corridors adjoining the showrooms are employed for showing ceiling fittings and floodlights. A striking feature of the more modern type of fittings displayed is the way in which lighting efficiency has been combined with decorative effect and pleasing colouring.

A section of Harcourt's lighting fitting showrooms at Crown House, Aldwych, London

Electric Rocking Furnaces

Referring to the article on this subject in our issue of July 9th, Metalectric Furnaces, Ltd., Smethwick, Birmingham, inform us that they are the sole agents for the Russ furnaces described, and have a licence to build them in this country. They are known here as "Metalectric-Russ" furnaces.

Prices of Materials

Henry Gardner & Co., Ltd., report, July 21st: Copper bars (best selected), sheet and rod, no change. English pig lead, £25 10s., £1 5s. dec. Spelter, £22 11s. 3d., 5s. dec. English block tin, £267, 10s. inc.

Frederick Smith & Co. report, July 21st: Electrolytic copper bars, £63 5s., 15s. dec. Ditto, ditto, wire rods, £67 5s., 15s. dec. Ditto, ditto, h.c. wire, 10d., ½d. inc. Silicum bronze wire, 10½d., ½d. dec.

Edward Till & Co. report, July 21st: India rubber, Para fine, no change.

Sanitary Inspectors' Conference

No fewer than 1,500 delegates are expected to attend the Jubilee Conference of the Sanitary Inspectors' Association which is to be held at Brighton from August 30th to September 4th. Factories, legislation, public cleansing, grit emission, and air-raid precautions are subjects to be discussed.

Social Events

The annual sports of the Automatic Telephone & Electric Co., Ltd., and Elexcel, Ltd., were held on July 3rd. The accompanying illustration shows the combined sales, cost, installation and general office team which won the tug-of-war event, with Mr. J. Nixon, works manager (left), with Mr. T. A. Eades, managing director, in the centre of the picture.

The annual outing of the Birmingham works of Wm. McGeoch & Co., Ltd., was held recently. A large party accompanied by friends travelled to Brighton by special train, breakfast being taken on the journey. The party reached Brighton soon after 11.30 a.m., and after sightseeing had luncheon at a resturant, Mr. Wm. McGeoch presiding. In the afternoon there was further sight-seeing and bathing, and the party left Brighton about 10 p.m., supper being served on the train.

The second annual horticultural show of the Henletel Social and Athletic Club was held at Henley's head office last Friday. The judges congratulated the exhibitors on the higher standard of entries compared with last year. Mr. S. Norris and Mr. C. Cocks each carried off four first prizes and two seconds.

An optimistic prediction of the future of the electrical industry was made by Mr. W. B. Woodhouse, managing director of the Yorkshire Electric Power Co., and Electrical Distribution of Yorkshire, Ltd., when he spoke in Leeds last week at a dinner and dance of the staff of Electricity House. He said that the electrical industry as a whole, manufacture, supply, contracting and apparatus sales, was the most progressive industry in the country and he had no doubt that whatever had been said in the past about progress, the next ten years would see amazing results. He presented prizes for highest sales competitions, the company's quarterly cup being won by Mr. T. Murgatroyd and his staff at Electricity House, Huddersfield. An interesting event of the evening was the presentation of a silver cup offered by Hoover, Ltd., for the best display of their products in the recent *Daily Mail* "Show and Sell" competition. This was presented to Mr. J. E. Rylands (manager, Electricity House) and to Mr. W. Jones (the company's display expert) by Mr. W. Rudd (area manager for Hoover, Ltd.). A picture appears on the opposite page.

A Russian Domestic Refrigerator

According to the *Monthly Review* of the U.S.S.R. Trade Delegation in the United Kingdom, the first Soviet-made household refrigerator has been manufactured by the Ordzhonikidze Tractor Plant in Kharkov and has passed all tests satisfactorily. The refrigerator is equipped with an automatic temperature regulator. Regular production of the model will commence in the third quarter of this year.

New Catalogues and Lists

Sturtevant Engineering Co., Ltd., 147, Queen Victoria Street, London, E.C.4.—An illustrated publication dealing with vibrating screens.

Ferguson, Pailin, Ltd., Higher Openshaw, Manchester, 11.—Catalogue sections dealing with trunk cubicle switchgear, single bus-bar metal-clad units, oil-immersed isolators, and also a survey of manufactures.

C.A.V.-Bosch, Ltd., Acton, W.3.—Working particulars and running instructions for C.A.V.-Bosch nickel-iron alkaline batteries.

Hotpoint Electric Appliance Co., Ltd., 24, Newman Street, London, W.1.—A catalogue of electric water-heating equipment of all kinds, and also washing-up machines.

J. Ismay & Sons, Ltd., Roden Street Works, Ilford.—A leaflet regarding "Relma" lamps.

D.P. Battery Co., Ltd., Bakewell.—An illustrated art booklet dealing with "Katholite" emergency lighting.

Hackbridge Electric Construction Co., Ltd., Hersham, Walton-on-Thames.—New publications dealing with "K" type and multi-ratio current transformers, static balancers, and small air-

Mr. W. B. Woodhouse presenting a prize at the quarterly dinner and dance of the Electrical Distribution of Yorkshire, Ltd. (See preceding page)

cooled transformers for various applications. A new technical booklet has also been produced called "The Maintenance of Transformers and Regulators."

Waite & Son, Ltd., Menin Works, Bond Road, Mitcham.—A 64-page illustrated art catalogue of lighting fittings, partly in colour, and thumb indexed to facilitate reference.

Bankruptcy Proceedings

W. Smith and **A.G. Smith,** trading as W. Smith & Son, 23, Crescent Street, Weymouth, as radio and electrical engineers.—When this public examination came before the Registrar at the County Hall, Dorchester, it was stated that W. Smith could not attend owing to illness. The joint statement of affairs showed a deficiency of £439, but it was pointed out that there were certain assets from W. Smith's private estate, which would reduce the joint deficiency to about £300. A. G. Smith said that in 1919 he joined his father in partnership, the commencing capital being £200, equally contributed. The business was moderately successful until about 1929, but with a change of premises the trade declined, and a considerable sum was expended on experiments with a motor-car ignition lock. A company was formed to exploit that invention, but it went into voluntary liquidation last year; the creditors were paid in full, but the shareholders received nothing. In 1933 the local Corporation began dealing in electrical fittings and that competition affected debtors' business. The turnover declined and the profits gradually disappeared. The examination was closed.

C. J. Tann, "Brianscot," Station Road, Wootton, Isle of Wight, previously carrying on business in partnership at 87, High Street, Newport, Isle of Wight, radio engineer.—This debtor attended at the Town Hall, Newport, recently for his public examination. His statement of affairs showed ranking liabilities of £568 and estimated assets of £215, leaving a deficiency of £354. Debtor stated that he commenced trading with money provided by another, who was a partner in the business and later withdrew. Debtor did the work of the business and at times, he said, he had more than he could cope with. His partner had promised to supply further capital, but did not do so, and eventually debtor had no alternative but to file his petition. After further questions the examination was closed.

G. H. Hewett, radio dealer and electrical engineer, 107, Kenton Road, Harrow.—This debtor attended on July 15th before Mr. Registrar Kean at the London Bankruptcy Court for public examination upon accounts showing total liabilities of £594 (ranking £400) and assets of £2, exclusive of certain stocks and shares returned as of problematical value. Debtor stated that he began business in November, 1929, and with a partner in March, 1937, formed the Hewelectric Co., Ltd., to acquire their business assets. His father sued him to recover a loan of £400 and obtained judgment in April, 1937, for £292, which debt formed the basis of these proceedings. The failure was attributed to insufficient capital and other causes. The examination was concluded.

W. R. Mew, Lushington Hill, Wootton, Isle of Wight, formerly carrying on business at Bembridge and St. Helens, Isle of Wight, wireless and electrical engineer.—The adjourned public examination was held at the Town Hall, Newport, recently. The statement of affairs showed unsecured liabilities of £117 and assets of £17, leaving a deficiency of £99. The failure was attributed to heavy overhead expenses and allowing too much on part exchange transactions. The examination was closed.

F. R. Keenan, electrical engineer and wireless dealer, 104, Cheltenham Road, Evesham, Worcestershire.—The public examination was held recently at the Guildhall, Worcester. It was stated that there were gross liabilities of £1,002, of which £306 was expected to rank for dividend, and the assets were put down at £32, leaving a deficiency of £274. Debtor attributed his failure to loss of contracts which were his main source of income, and drawing in excess of profits. The examination was closed subject to the signing of the notes.

G. Howarth, 36, Union Street, Bury, radio engineer.—The public examination was held on July 13th at the Court House, Bolton. The debtor attributed his failure to insufficient turnover and lack of capital. The statement of affairs disclosed liabilities of £385, with net assets of £80, leaving a deficiency of £305. The examination was adjourned for the signing of the notes.

C. E. Wheat (Radio Stores), wireless dealer, lately carrying on business at 2, Lichfield Road, Stafford, and now residing at Haughton, near Stafford.—First and final dividend of 10½d. in the £, payable at the Official Receiver's office, 12, Lonsdale Street, Stoke-on-Trent.

B. H. Auld, electrical engineer, 38, Sheen Common Drive, Richmond, Surrey, lately carrying on business as Bruce H. Auld & Co., at 66, Victoria Street, S.W.1.—First dividend of 3s. in the £, payable July 30th at the office of F. S. Salaman, 1-2, Bucklersbury, E.C.4.

C. H. Large, electrician, trading as "The Torquay and South Devon Electrical Co.," 1, Old Mill Road, Chelston, Torquay.—Trustee, Mr. J. S. Phillips, Lloyds Bank Chambers, 1, Vaughan Parade, Torquay, released July 8th.

H. Jeffree, radio dealer, 72 and 76, High Street, Thornton Heath, Surrey.—Receiving order made, June 12th, on a creditor's petition.

D. P. Phillips, formerly radio dealer, Cartref, Talog.—Receiving order made, July 12th, on debtor's own petition.

Company Liquidations.

London Electric Appliances, Ltd., Glengall Road, Old Kent Road, London, S.E.—The creditors met on July 16th, when a statement of affairs was submitted which showed ranking liabilities of £11,841 and assets amounting to £13,691, subject to preferential claims of £653 and debentures and interest totalling £5,300. The net assets, therefore, were £7,737, leaving a deficiency, as regarded the creditors, of £4,104. The ranking liabilities included cash creditors for £3,000 and a bank overdraft of £1,965, which had been guaranteed to the extent of £1,500, by two of the directors. Mr. R. Parsons, one of the directors, who presided, said that the company was registered in June, 1935, to acquire the rights of a scrubbing machine and to manufacture small portable wireless sets. The nominal capital was £15,000, of which £5,500 was issued for cash and was fully paid up. The company paid £1,000 for the manufacturing rights of the scrubbing machine and a further £2,000 on the granting of the final patents. The company had manufactured wireless sets, but at the outset trouble was experienced which was inseparable with new productions. Those troubles, however, were overcome and the trading to June 30th, 1936, showed a loss of only £75. In that year sums totalling £6,000 were spent in connection with the scrubbing machine, including the £3,000 paid to the inventor. The reason for the loss on trading during the last year was the low rate of gross profit earned. The turnover in that period was about £26,000, but the gross profit was only £4,000, owing to the severe competition which necessitated the design and production of new models, with the result that certain stock became obsolete. The company also had to face a rise in the price of raw materials after the selling prices of the new models had been fixed. In addition higher wages had to be paid and difficulties were experienced in obtaining certain parts. The last Olympia Exhibition was satisfactory, orders for over 2,000 sets being taken. The scrubbing machine was a commercial proposition and negotiations had been entered into for its sale, but no definite offer had yet been received. Mr. Burleigh, the receiver for the debenture holder, said that he was appointed on March 31st last and found that the business was being conducted at a loss. A purchaser was found for the stock, which had realised £2,354. It was thought that a substantial sum would be obtained for the scrubber but unless that was the case there would be nothing for the unsecured creditors. It was decided that the voluntary liquidation of the company should be continued with Mr. O. G. Sunderland, 15, Eastcheap, London, E.C., as liquidator, with a committee of the principal creditors.

Thompson Manufacturing Co., Ltd.—Claims to the liquidator, Mr. A. C. Malzer, 41, Montrose Avenue, Whitton, Middlesex, by August 18th. Meeting, August 20th, at Water Lane Works, Richmond, Surrey, to hear an account of the winding-up by the liquidator.

Kings Norton Electrical Co., Ltd.—Winding up voluntarily. Claims to the liquidator, Mr. F. E. Bendall, of Poppleton & Appleby, Midland Chambers, Warwick Passage, Corporation Street, Birmingham, by August 31st.

Wembley Rediffusion Service, Ltd.—Winding up voluntarily. Liquidator, Mr. W. C. T. Cran, Bush House, Aldwych, W.C.2.

Metropolitan Rediffusion Services, Ltd.—Winding up voluntarily. Liquidator, Mr. W. C. T. Cran, Bush House, Aldwych.

Private Arrangement

R. Pye, trading as Pye Electric Co., Kirby Lonsdale and St. Annes-on-Sea.—A statement of affairs presented at a recent meeting of creditors showed ranking liabilities of £719, of which £585 was due to the trade and the balance of £134 to the bank, and net assets of £305, leaving a deficiency of £415. The present position was attributed to the fact that the debtor had to travel considerable distances to secure contracts. He estimated that on one contract at Barrow he lost between £150 and £200. It was decided that a deed of assignment should be executed to Mr. N. Wilson, St. Annes, and Mr. A. H. Rodwell, Blackpool, subject to the claim of the bank being included for dividend purposes at only £33. It was stated that that condition would be complied with.

Electricity Supply

Lighting, Domestic, Power

Aberdare.—LOAN.—Application is to be made for permission to borrow £4,400 for cables, switchgear, etc., to provide a supply of electricity at the new engineering works to be opened by Aberdare Cables, Trecynon.

Ayrshire.—INSPECTION OF WORKS.—The Ayrshire Electricity Board recently held its annual inspection of works, followed by a dinner presided over by its chairman, ex-Bailie Bryce. In proposing the toast of "The Ayrshire Electricity Board," Mr. W. J. Cooper, engineering manager of Hamilton Electricity Department, referred to the proposed new legislation following the McGowan Report, and said that what they had to guard against was complete centralisation in some nebulous body in Whitehall. No form of organisation would be successful unless it had within it a good and well-represented expression of the opinion of the user of electricity, as well as of the man who produced it. Ex-Bailie Bryce, in reply, spoke of the greater demand from industry on account of the improved trade conditions. Regarding domestic development, he stated that an Ayrshire Branch of the Electrical Association for Women had been formed. In proposing the health of "The Officials and Staff," Mr. W. Bexon, manager of the Board, said that the average price of electricity in Ayrshire was very much lower than in any other county, the administration charge being only £12,000 on an output of 72 million kWh, and so many cookers had been ordered that manufacturers could not deal with them all. The Board was doing everything possible to develop the rural districts. Mr. J. L. Wilson, chairman of the British Electrical and Allied Manufacturers' Association; Provost Wills, of Ayr; and Alderman J. Potts, Carlisle, also spoke.

Barnsley.—LOANS.—Application is being made by the Town Council for sanction to the borrowing of £13,326, for the extension of mains as follows:—Park House rehousing scheme No. 1, £604; Pogmoor Road and West End Road mains, £2,061; Pitt Street sub-station, £820; Pitt Street distributing mains, £623; and general mains, £5,000.

Barrow-in-Furness.—STREET LIGHTING.—The Electricity Committee is to erect lamps on the Walney estate at a cost of £305.

Bradford.—EXTENSIONS.—Sanction is being sought by the Electricity Committee to a loan of £200,000 for electrical apparatus, and £20,000 for mains extensions.

Burton-on-Trent.—TESTING APPARATUS.—The Electricity Committee is to purchase new testing apparatus at a cost of approximately £1,500.

Carlisle.—SUPPLY EXTENSION.—A supply is to be given by the Electricity Committee next year to Scaleby Hill, Smithfield, and Hethersgill at an estimated cost of £5,483. The Council is also to spend £1,669 on supplying electricity to Low Row and Beckstonegate.

Chester.—INCREASED SALES.—Mr. S. E. Britton, the electrical engineer and manager, reports an increase in energy sold of 11 per cent. during the past year, the total being 24.4 million kWh.

China.—INCREASE IN ELECTRICITY OUTPUT.—The output of electricity in China in 1936 reached 1,740,000,000 kWh, an increase of 11 per cent. over the preceding year. There were then 456 power stations with a combined capacity of 585,424 kW. This total is now being augmented by 120,000 kW. Ten are foreign owned and represent 47 per cent. of the total plant capacity of the country, 58 per cent. of the annual power production and 62 per cent. of the aggregate sum invested in the electricity supply industry. The foregoing figures are extracted from a detailed survey of the industry which appears in the current *Chinese Economic Journal*. Of the remaining 446 power concerns, 23 are owned by the Government, 5 by joint Government and private enterprises, 4 by joint Sino-foreign interests and 414 by purely private interests. It is noteworthy that the annual output of electricity in China has more than doubled during the past decade. The most rapid development has been in the province of Kiangsu, where production amounted to nearly 252,000,000 kWh, or one-sixth of the total for the whole country, the province next in importance from an electrical point of view being Kuangtung, with 109,500,000 kWh. Most of the large large plants in Kiangsu are situated in Shanghai and Nanking.

Corby.—SUB-STATION.—A £14,000 sub-station is being constructed by the Central Electricity Board near Weldon Road, Corby, to link the existing grid line from Northampton *via* Kettering to Corby, with a new line which is being constructed from Leicester to Corby. The equipment for the sub-station which will be completed in September, is being supplied by the G.E.C. When the station and the new line of towers to Leicester are completed, Corby and district and Stewarts and Lloyds steelworks will have alternative sources of supply from Northampton or Leicester.

Dartford.—FIRE ALARM MODIFICATIONS.—The London County Council is to modernise the fire alarm system at Joyce Green hospital at an estimated cost of £2,050.

MAINS EXTENSIONS.—The Electricity Committee is to extend mains at a cost of £1,300.

Dorchester.—CHEAPER ELECTRICITY.—The following reductions in the charges for electricity have been adopted by the Town Council:—Domestic two-part tariff, cooking and water heating separately metered, from ¾d. to ⅝d. per kWh.; domestic fixed charge, a reduction of 12½ per cent.; cinemas, from 2½d. to 2d. per kWh. Hospitals and public buildings are to be included in the business two-part tariff.

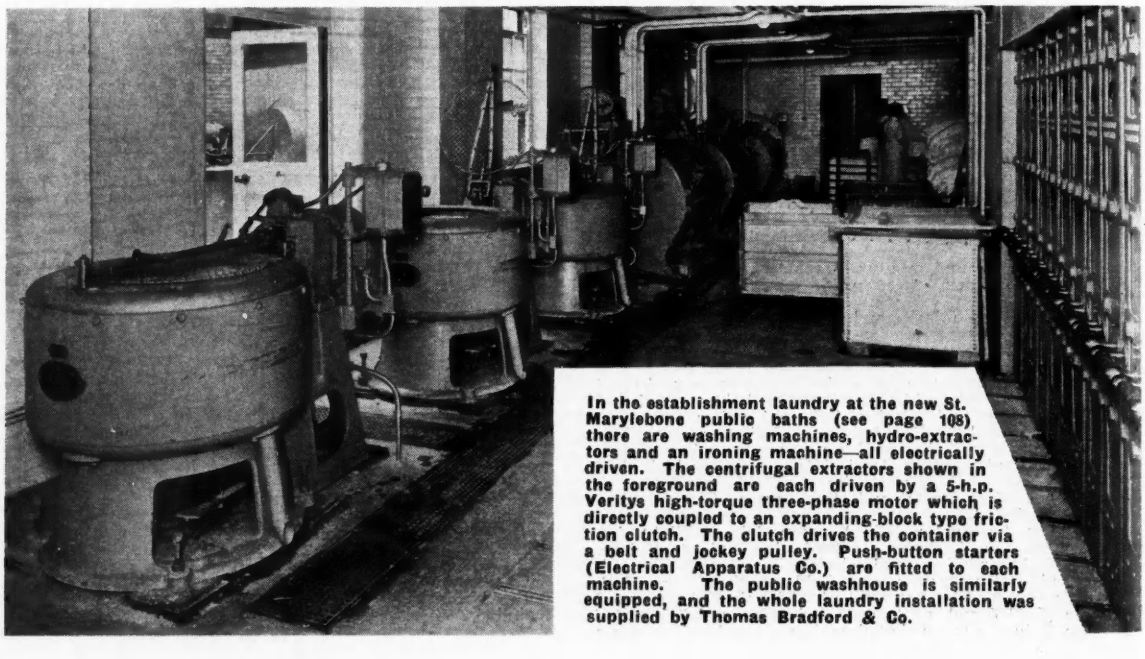
Dover.—SUPPLY TO GUSTON.—Sanction has been received by the Electricity Committee to a loan of £1,130, for the extension of the electricity supply to Guston.

Droxford.—EXTENSIONS.—The Portsmouth Electricity Committee proposes to extend mains to Anmore.

Dumfries.—GOOD PROGRESS.—At a recent meeting of the County Council, of which Mr. J. S. Pickles is electrical engineer, the chairman of the Electricity Committee gave details of the satisfactory progress being made by the electricity undertaking during the year just ended. About 1,220 new consumers were connected and 625 new cookers. A new scheme for the hire of water heaters, introduced in May, has met with remarkable success, 279 water heaters being applied for in the first two months. It is understood that the Council's application for an extension Order covering the parish of Castleton in the county of Roxburghshire has been approved.

Eston.—LOAN.—Sanction is being sought by the Electricity Committee to borrow £500 for rental wiring installations and £2,000 for services.

Fakenham.—INQUIRY.—The Walsingham Rural District Council, having refused to grant permission to the East Anglian Electricity Supply Co., Ltd., to erect overhead lines for street lighting in Fakenham, an inquiry was held on



In the establishment laundry at the new St. Marylebone public baths (see page 108) there are washing machines, hydro-extractors and an ironing machine—all electrically driven. The centrifugal extractors shown in the foreground are each driven by a 5-h.p. Veritys high-torque three-phase motor which is directly coupled to an expanding-block type friction clutch. The clutch drives the container via a belt and jockey pulley. Push-button starters (Electrical Apparatus Co.) are fitted to each machine. The public washhouse is similarly equipped, and the whole laundry installation was supplied by Thomas Bradford & Co.

July 15th on the authority of the Ministries of Health and Transport. It was the first inquiry of this type in Norfolk and was conducted by Mr. A. M. Rake. The Council was represented by Mr. J. J. McIntyre, and the company by Mr. A. Meakie, who explained that the need for extra lines came from the company's new contract with the Fakenham Parish Council for street lighting and had underground lines been stipulated their price would have been £115 or £120 higher.

France.—SUPPLY SITUATION IN PARIS.—Reports from a number of companies operating in the Paris region show that consumption has increased at rates varying from 3.3 per cent. for the Union d'Electricité to 8.7 per cent. for the Ouest Lumière. The disappearance of the trams has affected the Union d'Electricité sales, while general industrial activity and domestic development have permitted substantial increases elsewhere. There has been a recrudescence of criticism of the supply undertakings, which are being accused of making fabulous profits and of overcharging the small consumers, who in the Paris region pay a maximum price of 1.50 fr. (3.5d.) per kWh. Monsieur E. Mercier, chairman of the Union d'Electricité and of the Nord Lumière companies, after pointing out that rates have shown a smaller increase than any other commodity price over the past thirty years, recently pointed out that the prosperity with which they were credited was represented by a dividend of less than 4 per cent. on the capital invested. In the past year, he said, the prices of many commodities had risen by 50 per cent., but in the case of electricity supply it was only recently that they had been able to obtain an increase of 10 per cent. after the suspension of the normal rate index for almost a year. Monsieur André Benac, in his address to the Compagnie Parisienne de Distribution d'Electricité, said that the small consumer represented a loss to the company. Even the International Exhibition, which was expected to help the electricity companies in the Paris region, seemed so far to be giving them very little additional business. The results for the first five months of this year showed some improvement in consumption, but less than had been hoped for. The recent granting of a 10 per cent. increase in rates, however, was a good sign. It seemed to indicate that the authorities were beginning to realise the needs of the industry.

Gateshead.—CABLES.—The North-Eastern Electric Supply Co., Ltd., is to lay cables in Coulthards Lane and on the Hill Crest Estate, Lobley Hill.

Great Yarmouth.—POWER STATION.—An additional 6,000-kW transformer for the power station costing £2,396, and the second section of the modification of the switchgear costing £6,741, is under consideration by the Electricity Committee.

Guisborough.—UNDERGROUND CABLES.—Overhead lines are to be placed underground by the Urban District Council at a cost of £2,750.

India.—CALCUTTA ELECTRICITY SUPPLY.—The rates charged for electricity in Calcutta by the Electric Supply Corporation of Calcutta are considered to be very high, and on the strength of the complaints in this respect the Government of Bengal appointed a committee to go into the matter. This committee recommended a reduction of half an anna per kWh, but the Municipal Corporation considers that much greater relief is needed and that the charge must not exceed in any case one anna per kWh, the present rate charged by the Calcutta Electric Supply Corporation being 2 annas per kWh. The municipal committee considers the company to be over-capitalised and objects to the high remuneration over and above the ordinary remuneration, totalling £12,200, paid as directors' fees and £8,609 for the London establishment. In view of the fact that the company's undertaking is well-established, possessing a virtual monopoly and protected by statutory safeguards, a return of 6 per cent. on the capital receipts is regarded as fairly generous, while the committee considers that no case has been made out for the continuance of the obsolescence fund in view of the existing reserve and depreciation funds. It is recommended that the whole of the amount concerned, £50,000, should be applied to the reduction of rates. It is further stated that the management costs could be reduced by at least 25 per cent., as against 15 per cent. recommended by the Government Committee. If the rate is not reduced by the Electric Supply Corporation to one anna the committee proposes that the Municipal Corporation shall purchase the undertaking covered by the Calcutta licence and lease it out, on the basis of a "one-anna per unit" tariff, to another company at a premium equivalent to the amount of the consideration money. It is estimated that the actual amount which the Municipal Corporation would have to pay under the Indian Electricity Act would not be more than £1,000,000.

Kettering.—MAINS EXTENSIONS.—The Electricity Department is to extend mains along Cranford Road, Burton Latimer.

Lichfield.—EXTENSIONS.—The offer of the Electricity Committee for the supply of electricity to Manley College has been accepted by the authorities. The extension to Weeford and Little Hay is also to be carried out.

London.—PUMPING MACHINERY.—The L.C.C. is to replace steam pumps at the North Woolwich pumping station by electrical and oil driven machinery at a cost of £19,500. This is estimated to bring about a saving of £1,000 a year.

DEPTFORD.—A DISCHARGE LIGHTING INSTALLATION.—Alternative forms of lighting for the side streets have been considered by the Highways Committee, which has inspected specimen installations of 80-W discharge lamps and 200-W metal filament lamps which have been erected in Musgrave Road. As a result it has decided to have a uniform system of street lighting throughout the borough by electric discharge lamps and has given instructions for this installation to proceed. Deptford was one of the pioneers of the use of this type of lamp for street lighting, and when this installation is completed the borough will have, with the exception of Birmingham, the largest installation of low-wattage electric-discharge lamps in the country.

FULHAM.—Application is to be made for sanction to the borrowing of £372 for the provision of fire alarms in connection with the air-cooling plant at the power station, and for £237 for the provision of condenser-cleaning equipment.

ISLINGTON.—The Borough Council is to borrow £3,490 for the improvement of street lighting in six roads by the substitution of electric-discharge lamps for the present fittings.

STOKE NEWINGTON.—Application is being made for a loan of £944 for the improvement of lighting in four streets.

Manchester.—MAINS.—The Electricity Committee is seeking sanction to borrow £250,000 for distributor mains.

Middlesbrough.—IMPROVEMENTS.—The Town Council proposes spending about £1,150 on supply improvements in the Tollesby Road area, and proposes to erect a sub-station near Croft Avenue.

Minehead.—MERGER OPPOSITION WITHDRAWN.—The Minehead Electric Supply Co., Ltd., has been informed this week that Williton Rural District Council has withdrawn its opposition to the proposed merger of the Porlock and District Electric Supply Co., Ltd., with the Minehead Electric Supply Co., Ltd., and the extension of the supply area to Bossington, Porlock Weir and Oare.

Northants.—STREET LIGHTING.—A general report on the street lighting at Wellingborough is being prepared with a view to improvements being made, and at Irthlingborough the Council surveyor is to confer with the Rushden and District Electric Supply Co., Ltd., for a similar purpose.

Port Talbot.—BULK SUPPLY.—The Town Council has decided to accept provisionally the tenders and estimates for a bulk supply of electricity from the Central Electricity Board, and to apply for sanction to a loan of £90,983, the estimated cost of carrying out a part of the scheme.

Shipley.—KETTLES ON HIRE.—Electric kettles (3-pt. capacity) are to be let out on simple hire at a charge of 1s. per quarter.

South Africa.—JOHANNESBURG.—"Escom House," the new headquarters of the Electricity Supply Commission in Johannesburg, presents an imposing spectacle, being the highest building in South Africa rising to 236 ft. —twenty - one storeys. Considerable attention has been given to the lighting, and all the offices are temperature controlled. There are three high-speed Waygood-Otis passenger lifts and one goods lift, and leading off the elevator hall is the Hall of Achievement, wherein is displayed approved domestic electrical appliances obtained from all countries. Above the hall is a lecture theatre with seating accommodation for 215 people, the seats being arranged in tiers. A sound-motion picture projector is provided and the walls are lined with acoustic tiles. On the fourteenth floor is an analytical and research laboratory in connection with the generation of electricity, and in the basement is a garage, two boilers capable of generating 3,000 lb. of steam per hour for the heating of the building, and a motor-driven turbo-exhauster for cleaning. There are also a Diesel-engined automatic emergency lighting set and two fans in the roof with a capacity of 32,000 cu. ft. of air per minute. The Commission is the owner of six power stations with an aggregate capacity of 782,443 kW.

Escom House, Johannesburg

Southgate.—ALL-ELECTRIC HOUSES.—Extensions shortly to be made to the Council's housing scheme are to be all-electric. Electricity will be supplied by the Northmet Co., and tenants of the new houses will be charged on the all-in rate.

Southport.—LOWER M.D., BUT INCREASED SALES.—Last year the Electricity Department was in the enviable position of selling an appreciably larger quantity of energy with a lower maximum demand, with the result that the load factor of

the undertaking improved from 29.51 to 33.74 per cent. In 1935-36 an m.d. of 8,875 kW was recorded for an extremely short period and consequently affected the undertaking adversely. During the past year, although an additional 5,466 kW was connected, the m.d. was only 8,483 kW. This improvement was reflected in the financial results, the net profit of £26,087 being the highest yet recorded. Sales increased by 8 per cent. to 21.9 million kWh. It is recorded with satisfaction that the generating station, which prior to June 16th last had been closed down, has been in commission for the purposes of the Central Electricity Board for the whole time since then, and on many occasions has been called upon to meet a sustained maximum demand of over 11,000 kW. It is to be regretted that this interesting report is the last that we are to have from Mr. E. Moxon, the borough electrical engineer, who has not enjoyed good health recently and is resigning.

Swansea.—SUPPLY TO COLLIERY.—An agreement has been reached between the Electricity Committee and the Felinfran Colliery Co., Ltd., for a supply of electricity to the colliery at a cost of £4,000.

Sweden.—REGULATION OF GOTA RIVER.—Judgment has recently been given in the biggest case handled by any court in Sweden. The case was initiated over twelve years ago by the Waterfall Board, which asked permission to regulate the flow of water from Lake Vanern through the Göta River, on which three of its hydro-electric power stations are situated. This will largely consist in raising the level of the lake, which will cause damage to privately owned land along the shores. The documents in the case extend to 42,000 pages, with 1,600 maps, and the judgment is a printed book of 735 pages. Lake Vanern has an area of 5,550 sq. km. and a length of 140 km. The water level is on an average 44.34 m. above the level of the Skagerrack. It is intended to raise this level to 44.79 m. so as to improve the operating conditions for the three water-power stations. It is estimated that the net gain to the Waterfall Board will be not less than Kr.26 million.—*Reuter's Trade Service.*

Turkey.—NEW POWER STATIONS.—An *Exchange* message from Istanbul states that general surveys for two large power stations on the Black Sea have been completed. The second station will supply power to Istanbul, and the cost of both will be about 10,000,000 Turkish pounds.

Watford.—NEW EQUIPMENT.—Sanction is to be sought by the Electricity Committee for a loan of £12,000 for the installation of two extra-high-voltage feeders.

SUB-STATION.—Approval has been given to the terms for the erection of a sub-station at the works of the Saville Perfumery.

Whitby.—CHEAPER ELECTRICITY.—The lighting rate for electricity is to be reduced from 5d. per kWh for the first 500 kWh to 4½d. beyond, and the domestic tariff running charge from ¾d. to ½d. per kWh.

Wimbledon.—NEW EQUIPMENT.—Sanction has been obtained by the Electricity Committee to borrow £22,476 for the transformer sub-station programme.

Wotton-under-Edge.—STREET LIGHTING.—Despite the fact that the gas tender was £75 less than that for electricity (£283), electricity is to be used for street lighting during the next twelve months.

Traction

Austria.—NEW POWER CONTROL.—With the object of supervising from a central point the working of the electrified sections, the Austrian Federal Railways are to erect a central observation station with remote control so as to distribute quickly and economically the load of the five generating stations, four of them hydro-electric, which feed in parallel a common transmission network.

AN OVERHEAD-CONDUCTOR INSPECTION COACH.—The Austrian State Railway authorities have recently put in service a new design of electric trolley-wire inspection coach. It takes the form of a two-axle unit with a rapair and inspection platform which can be raised and swung round, and is equipped with compressed-air and hand braking and two driver's cabs. The electrical equipment comprises a Brown-Boveri counter-compounded generator driven by a Diesel engine developing 107 h.p. at 1,600 r.p.m. and a 58-kW nose-suspended motor.

Belgium.—LOCAL ELECTRIC STOCK.—The Brussels-Tervueren Railway, which caters for local traffic to the east of Brussels, recently purchased some motor-coaches and trailers from the Paris Metro in order to give increased facilities at rush hours, and is also to buy a 1,000-h.p. electric locomotive for goods trains. The electrification is on the 1,500-V d.c. system.

Bournemouth. — TROLLEY-BUSES SANCTIONED.—Sanction to run trolley-bus services on all the routes applied for, with the exception of Wallisdown Road and Ringwood Road, has been obtained by the Transport Committee.

Greece.—ATHENS ELECTRIFICATION.—It is reported that the disagreement between the Greek Government and the Athens Electric Co. has been settled, and that as a result the electrification of the Attica Railway from Athens to Kiphissia will be undertaken.

Italy.—HIGH-SPEED ELECTRIC SERVICES.—The six three-car streamlined electric trains built last year for the 3,000-V d.c. lines have begun high-speed operation from Bologna to Naples *via* Florence and Rome. The average speeds are 64.5 m.p.h. over the 59½ miles from Bologna to Florence; 62 m.p.h. over the ensuing 196 miles to Rome; and 71.2 m.p.h. over the final 130½ miles to Naples. More of these trains are now being built by the Soc. Ernesto Breda.

Liverpool.—PHOTO-ELECTRIC TRAFFIC CONTROL.—At the intersection of Queen's Drive and Muirhead Avenue, Liverpool, where there are double main roads joined by two minor roads, "Electromatic" traffic signals have been installed, controlled by beams of light directed across the road on to photo-electric cells.

London.—AN ELECTRIC TRAIN EXHIBIT.—An interesting exhibition of electric train equipment has been arranged by the Southern Railway at Charing Cross Underground station. Apart from specimens of the actual apparatus installed on the trains, there are working models of colour-light signalling equipment and a complete electric train system. Photographs draw attention to various aspects of the company's services. The exhibition will be continued until August 7th.

Newcastle-on-Tyne.—ELECTRIC TRAIN.—The L.N.E.R. has received delivery of the new electric train which is to be put into operation on the electrified line from Newcastle to Whitley Bay. The train consists of three third-class and one first-class coaches, each with accommodation for sixty passengers. The colour scheme is Post Office red and cream. Further orders have been placed for several more sets. The new train will be in operation about the end of this month.

Russia.—UNDERGROUND EXTENSIONS.—A *Reuter* report from Moscow states that the Underground railway is to be extended about eight miles. The construction of the new line is to begin during the current quarter, and it is planned to complete it in 1939.

RAILWAY ELECTRIFICATION.—Preparations have been commenced for the electrification of the 115-mile Apatite-Murmansk section of the Kirov Railway. The new section will, it is stated, complete the electrification of the entire railway system of the Kola Peninsula.

Electrification of the 43-km Zagorsk-Alexandrov section of the Yaroslavl Railway is nearing completion and trial runs of electric trains from Moscow to Alexandrov were made early in March. Previous to this only the Moscow-Zagorsk section of the line was electrified. With the completion of the electrification of the line the number of electric locomotives operating will be increased from eight to thirteen, according to the *Monthly Review* of the U.S.S.R. Trade Delegation in the United Kingdom.

Switzerland.—LIGHT-WEIGHT TRAINS.—The Berne-Lötschberg-Simplon Railway, the largest private line in Switzerland, has ordered three 800-h.p. two-car light-weight electric trains for its 15-kV single-phase lines. Trailers up to a total weight of 80 tons will be hauled.

Communications

Hexham.—NEW BROADCASTING STATION.—The new transmitting station being built by the B.B.C. at Bewclay, near Hexham, is expected to be completed and ready for opening by the end of September. All the main work has been done and the finishing touches are now being made. The power of the station will be about 50 kW.

Jamaica.—TELEPHONE SERVICE WITH ENGLAND.—A radio-telephone service between Kingston and St. Andrews in Jamaica and Great Britain was inaugurated on Thursday.

Malaya.—BROADCASTING.—A D.O.T. report on economic conditions in Malaya states that the opening on March 1st last of the Singapore medium-wave broadcasting station "ZHL," operated by the British Malaya Broadcasting Corporation, Ltd., has brought to the middle classes of Singapore and South Johore generally an amenity hitherto enjoyed only by those in a position to afford an expensive short-wave receiver. Outside of Singapore and South Johore broadcasting is on short waves, three programmes a week being broadcast from Kuala Lumpur by the Malayan Amateur Radio Society and nightly programmes from Penang by the Penang Wireless Society.

Electricity Output in the Irish Free State

The continued increase in the use of electricity in the Irish Free State is reflected in the monthly returns of output for the years 1934-1937, published in the current issue of the *Irish Trade Journal*. The following are the monthly outputs of the generating stations controlled by the Electricity Supply Board in millions of kWh:—

	1934.	1935.	1936.	1937.
January ...	20.26	23.55	28.68	31.38
February	17.45	20.18	24.77	27.44
March	17.76	17.55	23.18	28.60
April	15.30	14.85	20.81	23.40
May	13.88	14.89	18.50	—
June	12.68	14.58	17.40	—
July	12.99	15.02	18.36	—
August	13.94	15.76	17.41	—
September	14.54	17.90	19.89	—
October	18.35	21.60	24.96	—
November	21.22	24.97	28.37	—
December	21.91	27.89	31.01	—

The average monthly output during 1934 was 16.69 million kWh, during 1935 19.06 million kWh, and during 1936 22.78 million kWh.

Contract Information

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses

Contracts Open

Aireborough.—July 27th. U.D.C. Underwater pumping plant, driven by water-lubricated electric motor, and complete with float-controlled switchgear, rising main, valves, &c., at the Moor Top borehole, Guiseley. R. T. Haley, Micklefield House, Rawdon, near Leeds.

Australia.—MELBOURNE.—August 23rd. Harbour Trust Commissioners. Two 3-ton semi-portal electric cranes. (T.Y. 24974/37.)*

August 17th. Posts and Telegraphs Department. Accumulator plates and separators. (T. 25450/37.)* Trunk telephone and telegraph cable. (T. 25307/37.)*

October 12th. State Electricity Commission of Victoria. One 30,000-kW steam turbo-generator, complete with condensing and accessory plant. (See this issue.)

Blackpool.—July 27th. Borough Council. Stores, &c., for one year. (July 9th.)

August 14th. Four vertical-spindle axial-flow pumps and one drainer pump, together with electric motors, starting gear and necessary accessories, for the Lennox Gate pumping station. Borough surveyor, Municipal Offices, Talbot Square (deposit £1 1s.).

Bristol.—July 30th. Corporation. Reactors, transformers, switchgear, &c. (July 9th.)

Cardiff.—July 26th. King Edward VII Welsh National Memorial Association. Cables and joints, lighting and power and machinery and apparatus, including rectifiers, motors, &c., at the Glan Ely Hospital. (July 16th.)

Cheadle and Gatley.—August 6th. U.D.C. Electricity Department. 6.6-kV and medium pressure switchgear, also 350-kVA oil-cooled transformer, with automatic operated on-load tap-changer. (See this issue.)

Chelmsford.—July 28th. Borough Council. Rewiring the electric lighting installation at the Oaklands Museum. V. J. Willis, borough engineer, Municipal Offices (deposit £1 1s.).

Cirencester.—August 5th. U.D.C. Two sets of electrically driven vertical-spindle multi-stage centrifugal pumps (15,000 gal. per hr. each), with switchgear, control gear, water and electric meters, &c., for the new pumping station at Baunton. Binnie, Deacon & Gourley, Artillery House, Artillery Row, London, S.W.1 (deposit £10).

Congleton.—July 30th. Borough Council. One 2,000-kVA outdoor type transformer, complete with on-load tap-changing equipment, at the Bromley Road sub-station. (July 16th.)

Dartford.—July 24th. Borough Council. Cable. (July 9th.)

Edinburgh.—September 13th. Borough Council. Two feed pumps, de-aerator, evaporator, pipework, &c., at the Portobello generating station. (July 16th.)

Egypt.—CAIRO.—August 24th. Ministry of Public Works. Electric pumping station and its transmission line connection, complete with building work, machinery and accessories, at Bosat. Chief inspecting engineer, Egyptian Government, 41, Tothill Street, London, S.W.1 (deposit £3 1s. 6d. not returnable).

August 7th. A.c. single- and three-phase induction meters. (T.Y. 25483/37.)*

August 31st. Ministry of Public Health. 420-kW generating set, consisting of a three-phase alternator direct coupled to a vertical-type Diesel motor, in connection with the first extention of the new power station at Assiout. (T. 25185/37.)*

Elland.—July 28th. U.D.C. Various works, including electrical, in four blocks of dwellings on the Lindwell Road housing site. T. Exley-Fisher, Council Offices (deposit £1 1s.).

Finchley.—July 26th. Borough Council. Electrical supplies for eighteen months. (July 9th.)

Halstead.—July 31st. R.D.C. Two sets of electrically driven unchokeable centrifugal pumps. J. Taylor & Sons, engineers, Caxton House, London, S.W.1 (deposit £5).

Heston and Isleworth.—July 26th. Electricity Department. Sheet steel kiosk, complete with switchgear and one 300-kVA transformer; and 11-kV and 400-V switchgear. (July 16th.)

India.—SIMLA.—August 14th. Stores Department. Electric lamps. (T. 25004/37.)*

Irish Free State.—DUBLIN.—August 7th. Electricity Supply Board. One 8,000-kVA transformer, with on-load tap-changing equipment, at the generating station, Ardnacrusha, Limerick. (July 9th.)

July 30th. Commissioners of Public Works. Drainage pumping plant (18,000 gal. per minute capacity), together with electric motors, switchgear, &c., at the Shannon airport, Rinanna, Co. Clare. G. P. Fagan, Office of Public Works (deposit £1).

SLIGO.—Corporation. Wiring of 136 houses at Abbeyquarter. McDonnell & Dixon, architects, 20, Ely Place, Dublin (deposit £2 2s.).

Kingston-upon-Thames.—July 31st. Corporation. E.h.v. indoor type, remote controlled switchgear. (July 9th.)

August 30th. P.i. cables. (See this issue.)

Leeds.—July 28th. Mental Health Services Committee. Electrical work at "Crooked Acres," Spen Lane. J. E. Acfield, city engineer, Civic Hall.

London.—COMMISSIONERS OF WORKS.—July 28th. Steel conduits and fittings for electric wiring. (July 16th.)

August 4th. Electrical accessories. (See this issue.)

New Zealand.—WELLINGTON.—August 10th. Public Works Department. Engine-driven generating sets and switchgear. (T.Y. 24741/37.)*

October 12th. 110-kV outdoor switchgear and steelwork. (T.Y. 24915/37.)*

October 26th. Four 2,500-kVA transformers and accessories. (T.Y. 24834/37.)*

November 2nd. Testing transformer, induction regulator, control bench, switchgear, &c. (T. 24835/37.)*

Plymouth.—August 21st. City Council. Conversion of various lifts from d.c. to a.c. (See this issue.)

Prestwich.—July 28th. U.D.C. Twenty lanterns, complete with 150-W sodium lamps and all necessary electrical apparatus, and twenty steel tube pole extensions and bracket arms, to give a projection of 6ft. to centre of lantern. Engineer and surveyor, Town Hall.

Sheffield.—July 27th. City Council. Electric lighting installation at Woodsetts Council school. A. Rayner, 151, Cross Hill, Ecclesfield.

South Africa.—JOHANNESBURG.—August 14th. City Council. Rotary convertors, machine and starting panels, with instruments and necessary cables, &c. (T. 25180/37.)* H.v. switchgear and accessories, including control panels. (T.Y. 25108/37.)*

August 9th. Railways and Harbours Administration. Electric lamps. (T. 25102/37.)*

PRETORIA.—August 6th. Union Tender and Supplies Board. H.v. and l.v. switchgear and one 25-kVA transformer. (T.Y. 24649/37.)*

August 20th. Public Works Department. Switchgear. (T. 25111/37.)*

CAPE TOWN.—August 4th. Electricity Supply Undertaking. Transformers, copper wire, steel lighting poles and fittings, insulators and two switchboards. (T. 25187/37.)*

South Cambridgeshire.—July 27th. R.D.C. Duplicate vertical spindle centrifugal borehole pumps (8,000 gal. per hr. each), driven by electric motors, with automatic operation, and accessories. Sands & Walker, consulting enginneers, Milton Chambers, Nottingham (deposit £2 2s.).

Torquay.—August 18th. Electricity Undertaking. 33/11-kV transformers and switchgear, 33-kV, 11-kV and auxiliary cables and 33-kV overhead lines. (July 16th.)

Walton and Weybridge.—July 26th. U.D.C. Electricity Department. Twelve months' supply of domestic wash boilers. (July 16th.)

Warwickshire.—County Council. Heating and electrical work. (July 16th.)

West Lancashire.—August 11th. R.D.C. Two automatic electrically operated sewage pumps, one set of electrically operated automatic screening plant and aeration unit equipment for the Maghull sewerage scheme. H. B. Ward, consulting engineer, 26 ,North John Street, Liverpool, 2 (deposit £5 5s. in each case).

West Riding.—July 24th. County Council. Electric lighting in the South Elmsall Westfield Lane Council school. C. L. Crossley, divisional clerk, 8, St. John's North, Wakefield.

Electric lighting at the Upper Whitley Council school. L. J. Blackburn, divisional clerk, 8, St. John's North, Wakefield.

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* Further particulars from the Department of Overseas Trade (Inquiry Room), 35, Old Queen Street, Londonnn, S.W.1.

Contracts Closed

Acton.—Education Committee. Accepted. Electrical repairs at various schools (£163).—Page & Girling.

Australia.—BRISBANE.—City Council. Accepted. Power-house auxiliaries (£986) and boiler instruments (£276).—Babcock & Wilcox, Ltd. Aerial copper cable.—B. I. Cables (£1,796); Enfield Cable Works (Aust.) Pty., Ltd. (£943). Car wiring cable (£673).—Henley's.—*Tenders.*

Brighton.—Electricity Committee. Accepted. Five protective equipment for the Southwick power station (£1,919).—Pyrene Co.

Cheltenham.—Electricity Committee. Accepted. Cables for a further three months.—Hackbridge Cable Co.

Douglas (I.O.M.).—Electricity Committee. Accepted. Two generator switches (£1,576).—A. Reyrolle & Co.

Great Yarmouth.—Education Committee. Accepted. Electrical installation at Church Road schools (£295).—C. C. Boggis.

Property Committee. Accepted. Internal telephone installation at the Town Hall (£195 per annum for ten years).—Telephone Rentals (Telematic), Ltd.

Electricity Committee. Accepted. One 6,000-kW transformer (£2,396) and second section of switchgear modifications at the power station (£6,741).—English Electric Co.

Hastings.—Electricity Committee. Accepted. One 500-kVA transformer (£528).—Ferranti, Ltd.

London.—ST. PANCRAS.—Contracts and Stores Committee. Recommended. Electrical cooking and kitchen equipment for the Electricity Department's new premises in Georgiana Street.—G.E.C.; Jackson Electric Stove Co. Meter boards for twelve months.—Thomas de Halle. One 40-cell 270-Ah capacity battery for electric vehicle (£136).—Britannia Batteries, Ltd. Five h.v. switches for Carreras sub-station (£460) and h.v. switchgear at the West Hill Court sub-station (£170).—A. Reyrolle & Co.

HAMMERSMITH.—Electricity Committee. Recommended. Two switchgear units at the generating station (£562).—G.E.C. Three-phase e.h.v. switchgear and two-phase and single-phase

h.v. switchgear at the Broadway Chambers sub-station and the generating station :

	Three-phase e.h.v. £	Two-phase h.v. £	Single-phase h.v. £
Crompton, Parkinson	2,223	—	—
Switchgear & Cowans	2,453	2,245	1,266
General Electric Co. Recommended ...	**2,823**	2.133	1,190
English Electric Co.	2,924	3,319	1,970
Ferguson, Pailin. Recommended	2,977	**2,133**	**1,190**
British Thomson-Houston Co.	3,007	2,272	1,268
Johnson & Phillips	3,126	2.240	1,250
Metropolitan-Vickers Electrical Co. ...	3,131	2,133	1,190
Allen West & Co.	3,151	2,233	1,260
A. Reyrolle & Co.	3,332	2,133	1,190
Bertram Thomas	3,348	2,132	1,170

Northants.—County Council. Accepted. Internal telephone system at the County Buildings, Northampton.—Automatic Telephone & Electric Co.

Swinton and Pendlebury.—Town Council. Accepted. Electrical installation at the new Town Hall (£2,220).—Engineering Service Co.

Watford.—Electricity Committee. Accepted. Switchgear (£5,042).—Met.-Vick. Elecl. Co.

Wellingborough.—U.D.C. Accepted. Apparatus in connection with a £22,000 scheme for the reconstruction of the main drainage outfall sewers: Sewage pumping plant, motors and control gear (£1,660).—Mirrlees, Watson Co. Chlorination plant (£185).—Paterson Engineering Co.

West Bromwich.—Education Committee. Accepted. Electrical installations at four schools.—Electromobile Engineering Co. Similar work at one school.—Sanders & Prince.

Wimbledon.—Electricity Committee. Accepted. Cables for twelve months.—Britannic Electric Cable & Construction Co.

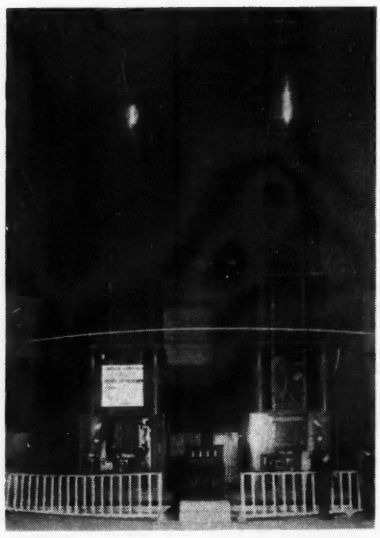
Notes

A Switchgear Accident

An inquiry was held at Hamilton recently by a sheriff and jury into the death of two electrical engineers, J. R. Taylor and J. C. Marshall, employed by the Clyde Valley Electric Power Co. Medical evidence was to the effect that death was due to burns, presumably caused by flames which shot out from an 11-kV bus-bar section switch which exploded when being closed by one of the men. A third man was injured. The switch was installed in March, 1935, and had been operated only about a dozen times since. The Procurator-Fiscal stated that in view of the technical investigation that would have to be made into the operation of the switch it would be unwise for the jury to return any other than a formal verdict. This was done on the instruction of the sheriff.

A Static Generator

One of the exhibits at the Paris Exhibition which will serve a permanent purpose after the exhibition is over, is a high-voltage generator which has been installed in the Palace of Discovery. It is of the van de Graaff type and is only the second one of its kind and size to be built anywhere. The machine consists of two copper spheres about ten feet in diameter, each set at the top of an insulating column. At the base is the charging equipment, this being connected to the spheres by means of belts set in motion by a small motor.



The high-voltage generator at the Paris Exhibition

The installation operates by the generation of static electricity which is conducted by the moving belt and accumulates in the spheres at the top, a potential difference of about 5 million volts being possible before the discharge takes place. The control equipment is situated on a desk placed between the two columns. This permits the speed of the belts, and hence of the charging, to be regulated. In order to protect other electrical equipment in the building against the discharges of the machine, the spheres and the greater part of the supporting columns have been encased in a Faraday cage. This has a diameter of about 96 ft. and a height of about 35 ft. and is made up of a copper-wire meshing stretched on a frame of steel tubes, suspended from the ceiling.

The machine, which was constructed by Mr. Lazard and Dr. Savel to the designs of M. Jolliot, will, after the exhibition, be taken to the Laboratory for Atomic Synthesis at Ivry.

Refusal to Connect up a Consumer

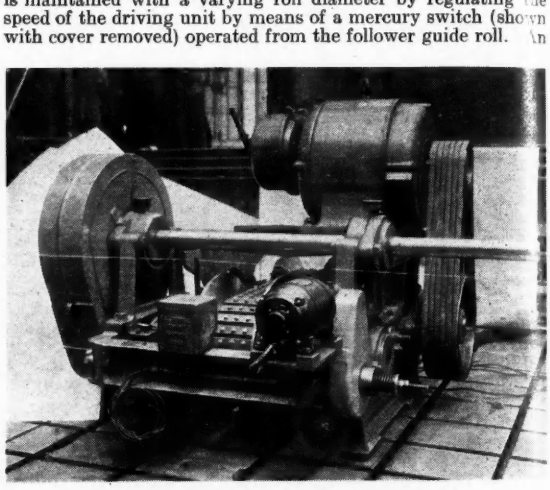
Judgment was given in plaintiff's favour at Luton County Court in a case brought by Mr. H. Clarke against Luton Corporation. According to the *Beds and Herts Evening Telegraph* plaintiff had appealed to the Electricity Commissioners against an award of an inspector upholding the refusal of the Luton undertaking to connect the wiring at a house in Dunstable on the ground that it was not satisfied with the wiring. His finding, was, however, set aside by the Electricity Commissioners, who awarded the costs incidental to the proceedings and before then to the plaintiff. The Corporation disputed the claim for £144 4s. as costs on the ground that they were excessive and the Registrar assessed them at £102 9s. 9d., which sum, together with costs of the County Court proceedings, was allowed to the plaintiff.

The I.E.E. Overseas Members' Conversazione

We regret that an error occurred in the inscription to the pictures taken by us at this event and published in our last issue. In No. 4 the lady and gentleman on the left were described as Mr. and Mrs. E. F. Cater; actually they were Major and Mrs. E. T. G. Carter, formerly of Malta.

A Textile Machine Drive

The accompanying photograph shows the application of a variable-speed drive to a textile mill. Constant winding speed is maintained with a varying roll diameter by regulating the speed of the driving unit by means of a mercury switch (shown with cover removed) operated from the follower guide roll. An



Variable-speed drive in a textile mill

automatic cut-out can be adjusted to function at predetermined speeds, high or low. A 7-h.p., 710-r.p.m. C.P. motor drives, by means of a "Sure-grip" vee-rope, a Croft open-type variable-speed gear (ratio 12 to 1) which in turn drives the machine through a pair of spur gears, giving infinite speed variation on the output shaft between 344 and 28.6 r.p.m.

Appointments Vacant

Maintenance electrician for the University of Liverpool.

Assistant inspectors for the War Department.

Switchboard attendant and meter room assistant for the North-West Midlands J.E.A.

Telegraph inspectors for the combined Posts and Telegraphs Department of Kenya, Uganda and Tanganyika.

Mains assistants in the drawing office, Works' Directorate, Air Ministry.

Engineer for heating and hot water installations at the University of Manchester.

Assistant secretary for the North Western area of the Electrical Power Engineers' Association.

Lecturer in the Engineering Department of the Brighton Technical College.

Meter tester and repairer for the Peterborough Electricity Department.

Mechanical and electrical assistants for the Air Ministry.

Two junior mains draughtsmen for the Blackpool Electricity Department.

(See our clasified advertisements.)

Our Service Department

EVERY day inquiries of all kinds are received by the Editors, the bulk of them relating to the producers of specified classes of electrical goods. We are able to reply to most of these with the aid of our extensive records, but in a few cases we have to seek the assistance of our readers. This week we have been asked for the names and addresses of manufacturers of the following :—

ALPHA potato peelers.
MONO products.
MOORHOUSE connectors.

Readers should enclose stamped addressed envelopes when making their inquiries.

Our Personal Column

Electrical men are invited to keep readers of the "Electrical Review" posted concerning their movements

The Earl of Rothes has accepted the appointment of chairman of the governors of Faraday House Electrical Engineering College in succession to the late Lord Castletown.

Mr. W. H. Sikes, manager to Burn & Orson Wright, Ltd., mechanical and electrical factors, was married at Leicester on July 14th to Miss Marjorie Linney.

The engagement is announced of **Miss Gladys F. Sharp,** eldest daughter of Mr. Ernest E. Sharp, director of Venner Time Switches, Ltd., to Mr. W. P. Scott, manager of Alford & Alder, Ltd., motor engineers and contractors. Miss Sharp is a member of the National Executive of the Electrical Association for Women, and she has travelled extensively on the Continent, in the East and in Australia and New Zealand.

Mr. H. P. Hill, M.Inst.C.E., of Manchester, has been elected chairman of the Association of Consulting Engineers for the year 1937-38.

Mr. T. M. F. Tamblyn Watts, A.M.I.E.E., who has retired from the Southend-on-Sea Corporation Electricity Department after twenty-six years' service, has been presented by members of the staff with a set of drawing instruments. The presentation was made by Mr. A. C. Johnson, the borough electrical engineer.

Mr. B. C. Robinson, of the testing department of C. A. Parsons & Co., Ltd., Heaton, Newcastle, has been awarded the Swan Memorial Scholarship by the Institution of Electrical Engineers. He is a former Armstrong College, Newcastle, student.

Mr. H. S. Thompson, superintending engineer, South Wales Engineering District, has been appointed superintending engineer, Ireland North Engineering District, in succession to Mr. T. T. Partridge, who is retiring on September 30th.

Mr. P. M. S. Blackett, M.A. (Cantab.), F.R.S., has been appointed by the Council of Manchester University Langworthy Professor of Physics in succession to Professor W. L. Bragg, F.R.S., who, as we have already reported, vacates the position on November 1st to take up the appointment of Director of the National Physical Laboratory. Mr. Blackett is at present Professor of Physics in the University of London (Birkbeck College).

Mr. W. M. L'Estrange has retired from the position of chairman and managing director of the City Electric Light Co., Ltd., Brisbane. **Mr. J. H. Holmes** succeeds him as chairman and **Mr. E. S. Cornwall** is appointed general manager of the company. Mr. L'Estrange was born in Dublin and went to Queensland in 1886, where he joined Barton & White, the predecessors of the Brisbane Electric Supply Co., Ltd., and the City Electric Light Co., Ltd. He was secretary to the Brisbane Electric Supply Co., Ltd., and for many years secretary to the City Electric Light Co. When the Ipswich Electric Supply Co., Ltd., was registered in 1917 he became its first secretary and later was chairman. He has not fully severed his connection with the industry as he still retains his seat on the boards of the two electric light companies. He has been granted leave of absence for twelve months and his son, Mr. G. G. L'Estrange, is acting as his alternate director on the boards of the companies.

Mr. H. E. Walker, of Birmingham, was elected president of the National Association of Radio Retailers, Ltd., for 1937-38 at a meeting of the Council held on July 12th. Mr. H. E. Walker is also president of the Electrical Contractors' Association and allied organisations. **Mr. F. J. Smith,** of Leicester, was elected vice-president. Arrangements were also made for the first annual general meeting to be held on September 1st.

Mr. J. Steele, at present with the English Electric Co., Ltd., has been appointed by the British Electrical Development Association to be responsible for development work in connection with trolley-buses and electric battery vehicles in succession to the late Mr. R. L. Acland. Mr. Steele takes up his new duties in September.

Mr. R. Woods, A.M.I.E.E., has severed his connection with Ferguson, Pailin, Ltd., in order to commence an agency centred in Manchester. He will be handling the products of Bryce, Ltd., Hackbridge Cable Co., Ltd., and Nevelin Electric Co., Ltd., in Lancashire, Cheshire, North Wales, North Staffordshire and the Isle of Man. Mr. Woods served his apprenticeship with the Park Royal Engineering Co., Ltd., and received his technical training at the Regent Street Polytechnic. He subsequently held appointments with the Park Royal Engineering Co., Ltd., and with the B.E.A.M.A., joining Ferguson, Pailin, Ltd., in 1929. His address is 5, Whitworth Park Mansions, Manchester, 14.

[*Elliott & Fry.*
Mr. R. Woods

Obituary

Dr. P. W. Sothmann.—The death is reported from Berlin at the age of sixty-seven years of Dr. Peter W. Sothmann, an electrical engineer who had been prominently identified with many large electrical projects in different parts of the world. He was of Danish birth, and received his technical education in Germany, where he later became associated with Siemens & Halske, of Berlin. Subsequently he joined the A.E.G. as chief engineer of the large power plant department. In this connection he went to Strasbourg, where he did pioneer work in the parallel operation of alternators. In 1906 he was appointed chief engineer of the Ontario Hydro-Electric Power Commission, where he laid the foundations for the present extensive system. After engaging in other large and important work in the United States, Canada and South America he went to the Irish Free State in connection with the Shannon Scheme on behalf of Siemens-Schuckert.

Mr. L. Hitchcock.—The death occurred on July 15th at Marseilles, of Mr. Lionel Hitchcock, late manager of the Eastern Telegraph Co., Ltd., Marseilles.

Mr. J. Sloan.—We regret to learn from the Sloan Electrical Co., Ltd., that their Edinburgh branch manager, Mr. James Sloan, died on July 16th at the age of sixty-three. Mr. Sloan opened the Edinburgh branch in 1919.

Wills.—Mr. J. S. Anderson, secretary and treasurer of the London Passenger Transport Board, left £36,179, with net personalty £19,855.

Mr. A. R. Holland, a director of the Midland Counties Electric Supply Co., left £77,474 (net personalty £75,745).

Financial Section

New Companies. Official Returns of Capital. Debenture Charges. Reports of Electrical Companies. Dividend Announcements. Transactions in Stocks and Shares

New Companies Registered

Leland Instruments, Ltd.—Private company. Registered July 12th. Capital, £100. Objects: To carry on the business of manufacturers, importers and exporters of, agents for and dealers in radio, wireless and television and/or electrical goods and appliances, &c. The subscribers are: L. W. Chapman, 591, Kings Road, Fulham, S.W.6. and A. Wilson, 62, Myddelton Square, E.C.1. Solicitors: Zeffertt & Heard, 17, Coleman Street, E.C.

Princely Products, Ltd.—Private company. Registered July 12th. Capital, £150. Objects: To carry on the business of motor, radio and electrical dealers, &c. The subscribers are: L. J. Clark, 32, Grovelands Road, N.13, and R. C. Pitt, 126, Sherringham Avenue, N.15. Solicitor: A. H. Hamilton-Hill, 3, Aldermans Hill, N.13.

Major Radio & Television, Ltd.—Private company. Registered July 14th. Capital, £500. Objects: To carry on business as radio dealers, manufacturers of and dealers in sound reproducing machines of all kinds, radiograms, television sets and equipment, &c. The subscribers are: W. S. Gibson, 83, Grosvenor Road, Muswell Hill, N.10, and R. Blanks, 200, Holland Park Avenue, W.11. Solicitors: Kenneth Brown Baker Baker, Essex House, Essex Street, W.C.2.

C. H. Blackburn & Co., Ltd.—Private company. Registered July 14th. Capital, £1,000. Objects: To carry on the business of manufacturing electrical and general engineers, manufacturers, importers and exporters of and wholesale and retail dealers in electro-medical apparatus, sterilisers, electrical and mechanical appliances, wireless, gramophones, &c. The directors are: C. H. Blackburn, 17, Hollycroft Avenue, Wembley Park, Middlesex, and A. H. Body, 15, Clanricarde Gardens, Bayswater, W.2. Registered office: 2, Sandland Street, W.C.1.

Hy Heat Productions, Ltd.—Private company. Registered July 14th. Capital, £1,000. Objects: To carry on the business of manufacturers of and dealers in or selling agents for and distributors of electric heating elements or hot plates for electric cookers and other electrical apparatus, &c. The directors are: C. L. Grimwood, 32, Copse Avenue, W. Wickham, Surrey, and three others. Registered office: 47, De Beauvoir Road, N.1.

Waldon Manufacturing Co., Ltd.—Private company. Registered July 13th. Capital, £1,000. Objects: To acquire the business of an engineer now carried on by W. G. Donaldson as the Waldon Manufacturing Co., at 13, Hardwidge Street, S.E.1, and to carry on the business of electrical engineers, iron and brass founders, boilermakers, wire-drawers, &c. The permanent directors are: W. G. Donaldson, 147, Strathyre Avenue, Norbury, S.W.16, and D. W. Reay, 6, Court Road, Ickenham, Middlesex. Registered office: 13, Hardwidge Street, London Bridge, S.E.1.

Bristol and Western Electrical Supplies, Ltd.—Private company. Registered July 16th. Capital, £100. Objects: To carry on the business of agents for and manufacturers of and dealers in electrical appliances and goods of all kinds, electrical and mechanical engineers, &c. The directors are: A. C. Astor, Dorset House, Upper Gloucester Place, N.W.1, and A. Russell, 1, Wardour Street, W.1. Registered office: 1, Wardour Street, W.1.

Rippingilles, Ltd.—Private company. Registered July 15th. Nominal capital, £100. Objects: To carry on the business of manufacturers of and dealers in lamps, stoves and other apparatus and appliances of all kinds for lighting, heating and cooking, whether by oil, gas, electricity or other means, &c. The subscribers are: C. L. Fawcett, Hatton, Sevenoaks, solicitor, C. R. Sharpe, Crossways, Southall Lane, Eastcote, Middlesex, managing clerk, and five other clerks. Solicitors: Stephenson Harwood & Tatham, 16, Old Broad Street, E.C.

C. Taylor (Windsor), Ltd.—Private company. Registered July 16th. Capital, £100. Objects: To carry on the business of electrical engineers, contractors, merchants, factors and wireless manufacturers, &c. The directors are: C. Taylor, 1, Oxford Road, Windsor, and L. Taylor, 40, Albany Road, Windsor. Registered office: 1, Oxford Road, Windsor.

Returns of Electrical Companies

Painter Brothers, Ltd.—Capital, £40,000 in 30 000 ordinary shares of £1 and 8,000 "B" ordinary and 12,000 preference shares of 10s. Return dated March 15th, 1937. 30,000 ordinary and 12,000 preference shares taken up. £36.000 paid. Mortgages and charges: £29,000. (Loan secured by debentures.)

Oswald Anderson, Ltd.—Capital, £500 in £1 shares. Return dated March 12th, 1937. 300 shares taken up. £300 considered as paid. Mortgages and charges: £500.

R. King & Sons, Ltd.—Capital, £5.000 in £1 shares. Return dated March 20th, 1936 (filed February 19th, 1937). All shares taken up. £1.200 paid, £3,800 considered as paid. Mortgages and charges, nil.

Wright Electric Motors (Halifax), Ltd.—Capital, £6,000 in £1 shares. Return dated December 22nd, 1936 (filed January 2nd, 1937). 4 146 shares taken up. £4,146 paid. Mortgages and charges: £2,843.

"T.X." Products Co., Ltd.—Debenture, charged on the company's undertaking and property, including uncalled capital, dated July 9th, to secure £500. Holder: J. S. Peress, Ltd., Catherine Wheel House, High Street, Brentford.

Violite (1933), Ltd.—J. Diamond, Shell Mex House, W.C.2, ceased to act as receiver and manager on July 7th.

Lomax & Samways, Ltd.—The nominal capital has been increased by the addition of £4.000 in £1 ordinary shares beyond the registered capital of £1,000.

Barton & Sons (1935), Ltd.—The nominal capital has been increased by the addition of £250.000 beyond the registered capital of £250.000. The additional capital is divided into 1,000,000 ordinary shares of 5s.

Electrical Manufacturers Finance Co., Ltd.—The nominal capital has been increased by the addition of £140.000 in £1 ordinary shares beyond the registered capital of £10.000. At March 19th, 1937, Associated Electrical Industries, Ltd., held 9,997 shares out of 10,000 issued.

Walters & Co. (Parkstone), Ltd.—Debenture, charged on the company's undertaking and property, present and future, including uncalled capital, dated June 30th, 1937, to secure £8,000. Holders: Branch Nominees, Ltd.

Automatic Electrical & Mechanical Controls, Ltd.—Issue on July 5th, 1937, of £400 debentures, part of a series already registered.

Player Distributing Co., Ltd.—Debenture, charged on the company's undertaking and property, including uncalled capital, dated July 5th, 1937, to secure £1,000. Holder: Mrs. J. Norfolk, 122, Dorset House, Gloucester Place, N.W.1.

Newcastle & District Electric Lighting Co., Ltd.—Capital, £600.000 in £1 shares. Return dated April 2nd, 1937. All shares taken up. £600,000 paid. Mortgages and charges: £150,000.

City Notes

The Palestine Electric Corporation, Ltd., held its annual meeting on July 15th when Viscount Samuel (chairman) said that notwithstanding the serious unrest in Palestine during the year under review the accounts showed a continuation of the uninterrupted progress of their business. Their policy of reducing wherever possible the rates of charge for electricity had resulted in a steady rise in the consumption. The figures showed that in 1936 the amount of energy sold was 30 per cent. greater than in the previous year, while the gross revenue was 19 per cent. more. Considerable reductions in various classes of rates had again been made, which had come into force this year. The extension of the building of the Haifa power house was completed during the year and the two additional boilers for that power house were now installed. Work on the Reading power house was proceeding rapidly, and it was expected that the erection of the plant would commence next month and that the station would be brought into use early next year. With the completion of the Reading power house the total installed capacity in all their power stations would be 77,000 kW. The continued expansion of demand had necessitated considerable capital expenditure. To meet this, and to provide for requirements which were anticipated in the near future, the directors proposed that a further issue of share capital should be made. They therefore proposed to increase the capital from £2,500,000 to £4,000,000, although it was not intended at once to issue shares to the whole amount of the increase. At an extraordinary meeting which followed the annual meeting resolutions were passed increasing the capital and making certain amendments in the articles of association.

Christy Bros. & Co. report a profit for the year ended March 31st of £24,174, as against £21,064 in the previous year, to which is added dividends on investments, profit on sale of investments, transfer and registration fees, and £21,018 brought in, making £65,017. After deducting tax, interest on loans, &c., and placing £15,000 to reserve and £1,000 to employés' superannuation account, there is a balance of £37,838. The ordinary dividend is maintained at 10 per cent., and £22,838 is carried forward. The report states that the turnover amounted to £338,905, as against £262,444 for the previous year. The amount representing the value of uncompleted contracts is £70,318 (£40,640). The increase arises principally from the contract for No. 3 hydro-electric scheme which the company has in hand for the West Devon Electric Supply Co., and which is now approaching completion. The North Somerset Electric Supply Co., and the West Devon Electric Supply Co., in which the company holds substantial interests, continue to make satisfactory progress. The revenue of Christy Bros. (Wireless Relays) for the year to March 31st shows considerable improvement. The Burnham-on-Sea and Camberley undertakings are not yet working at a profit, but the larger profits on the Chelmsford and St. Neots undertakings have resulted in a net profit on the group.

Thomas De La Rue & Co., Ltd., held their annual meeting on July 14th, when Mr. S. S. Lamert (chairman), who presided, reviewed the accounts and said that in the past year they had experienced a large increase in turnover and the net profit showed an improvement of about 60 per cent. Rapid developments were taking place at Walthamstow and additional machinery had been provided. In all departments good progress was being made and they already had sufficient work in hand this year to ensure that the results in 1937 would be not less satisfactory than the figures for 1936. With regard to the moulding business, Mr. B. C. Westall (vice-chairman and managing director), said that they were making rapid strides and he claimed that there was no moulding business in this country better equipped either to turn out a superior article or to produce a greater volume of work than they were.

Sheffield Steel Products, Ltd., report a profit on trading amounting to £31,225 for the year ended March 31st last. After crediting sundry income totalling £2,162 and debiting head office charges (£5,201), directors' fees (£2,180), non-recurrent costs of reorganisation (£3,228), bank interest (£2,482) and debenture interest (£19,282), a credit balance of £1,015 is carried forward. The directors point out that the accounts are of a transitional character and are not comparable with the accounts of preceding years because of the sale during the year of two of the branches and the assets of two of the company's subsidiaries.

Crossley Bros., Ltd., record a profit of £45,453 for the year ended April 30th as compared with £49,249 for the preceding year. A sum of £15,000 (same) is placed to reserve and £11,000 (nil) goes to reserve for foreign debts, making this reserve £20,000. After paying dividends on the preference and preferred ordinary shares £27,686 (£28,402) is carried forward. In his speech to be delivered at the annual meeting on July 26th the chairman, Sir Kenneth Crossley, states that, while good progress has been made in the Dominions and Colonies and in some foreign countries, the civil war in Spain has meant a serious loss to the total foreign business of the company, no work having been done there since the start of the revolution. Since the Abyssinian conflict trade with Italy has practically ceased, too, and may be difficult to revive. Prospects for the current year appear to be good and orders in hand for standard products alone at the end of June are approximately double the value at the corresponding time last year. Furthermore, Government contracts will provide considerable extra work. An extraordinary general meeting is to be called shortly to adopt new articles of association.

Crossley Premier Engines, Ltd., a subsidiary of Crossley Bros., Ltd., shows a profit of £42,685 (as compared with £30,540 for the preceding nine months). After placing £7,500 (£5,000) to general reserve, £7,500 (£5.000) to depreciation reserve, £1,800 (nil) to staff pension fund, and paying dividends on the 5½ per cent. cumulative preference shares and ordinary shares 12½ per cent. as against 10 per cent. for nine months, £5,924 (£3,915) is carried forward.

The Victoria Falls and Transvaal Power Co., Ltd.—Presiding at the annual meeting held on Tuesday last Mr. A. E. Hadley, chairman and managing director, said the sales of electricity in 1936 amounted to 2.300 million kWh, an increase of 17 per cent. over 1935, and this improvement continued in the current year. Consumers had benefited by further reductions in charges amounting to £93.000. In view of the activity in the mining industry it was expected that when the Klip station was completed in 1940 it would be fully loaded to its capacity of 420,000 kW, and that further demands would still have to be met. The question of another generating station was therefore receiving attention in co-operation with the Electricity Supply Commission. On the Zambesi the installation of two 1,000-kW hydro sets for supplying electricity to Livingstone was expected to be completed by the end of the year. Recent years had seen great changes at Livingstone, due to the copper development in the North, and the change in the

financial position of Northern Rhodesia might lead to new and increasing activities.

The Nigerian Electricity Supply Corporation, Ltd., reports that during the year ended February 28th the financial position has much improved, due to a considerable increase in consumption of electric power consequent upon improvement in world trade and the demand for tin. Consequently the net profit for the year has increased from £34,335 to £61,266. After providing for debenture stock redemption and income tax it is proposed to pay a dividend of 7½ per cent. (against 4½ per cent.) on the preferred ordinary shares and to place £20,000 (nil) to the preferred ordinary share reserve fund, carrying forward £2.971 (£2,433). In anticipation of still further demand being made upon the corporation for power, a considerable amount of capital expenditure is being incurred in harnessing the Jekko Falls and constructing an additional power house.

Thorn Electrical Industries, Ltd., states in its first report, for the year ended March 31st, that the combined profit of the company and its subsidiaries after charging all working expenses and providing for depreciation, was £49.259, which compares with £43.364 for the preceding year, as shown in the prospectus of December last. After providing for directors' salaries and fees, income tax, &c., there remains 31,490, of which £2,850 has been applied in writing down the cost of certain shares in a subsidiary company (the proportion of the profit for the year accrued before the acquisition of the shares). A balance of £4,409 is brought forward, making £33,049 available out of which the directors recommend a dividend of 20 per cent. on the ordinary shares and the transfer of £12,500 to reserve, leaving £5,080 to be carried forward.

Thomas Bolton & Sons, Ltd., report a gross manufacturing profit for the year ended March 31st of £232.871, as compared with £163.080 in the preceding year, and after deducting administrative charges, the net amount carried to the balance sheet is £187,100 (against £127,218). After providing for debenture interest, depreciation, &c., and adding £17.031 brought in, there is a balance available of £74,915. The dividend for the year is 10 per cent., and £24,915 is carried forward. The report states that the demand for the company's manufactures has been on a larger scale than last year. The works have been fully employed, records of production having been created in several departments.

Ultra Electric (Holdings), Ltd.—Presiding at the annual meeting held on July 15th Mr. E. E. Rosen (chairman) said that they held the whole of the issued capital of Ultra Electric, Ltd. The results of that business showed a striking improvement over the previous year. The reorganisation of all departments of the business was nearly completed during the financial year, and whilst the benefits derived from that had already been substantial, the full benefits had not yet accrued. As regarded the outlook, their sales since April had been well maintained, and with their new range of models they anticipated that next year's report would be even more satisfactory.

Companies Struck Off the Register.—The following companies have been struck off the Register as from July 16th :—The Abbey Electrical Co., Ltd.; Bela Radio, Ltd.; Epoch Radio Mfg. Co., Ltd.; European Hydro-Electric Co., Ltd.; Mechanical & Electrical Engineering Co. (Sheffield), Ltd.; Olympia Radio, Ltd.; Premier Radio & Gramophone Co., Ltd.; Solaflex Signs Amalgamated, Ltd.; Spencer Radio, Ltd.; Telephone Berliner (London), Ltd.; Alfred White Electrical Co. (1931), Ltd.; and the Wireless, Gramophone & Electrical Trades Association, Ltd.

Bruce Peebles & Co., Ltd.—The amended scheme as to the capital was adopted at meetings of shareholders held in Edinburgh on July 14th. Under it an allotment to the preference shareholders of ordinary shares in nominal value equal to 30 per cent. of the value of the preference shares held by each shareholder will be made in satisfaction of arrears of dividend to December 31st, 1936. The right of the preference shareholders to an additional 2½ per cent. dividend contingent on the profits of each year is retained.

Falk, Stadelmann & Co., Ltd., report net profits for the year ended March 31st of £127,568, as compared with £119,685 for the preceding year. After deducting £10,463 for income tax and placing £5,000 to reserve for decrease in value of British Government securities, it is proposed to pay a dividend of 10 per cent. on the ordinary shares, to place £15.000 to reserve, and £5,000 to the staff pension and benevolent fund. The balance carried forward is £23,608, against £20.752 brought in.

Allen West & Co., Ltd., are offering shareholders 470,000 5s. ordinary shares at par and £225,000 4½ per cent. first mortgage debenture stock at £99 per cent. Shareholders are entitled to an allotment of three new ordinary shares in respect of every ten held and may also apply for any surplus not taken up by other shareholders. The proceeds will be used to repay the existing first and second 6 per cent. debentures and a bank overdraft secured by the deposit of £190,000 first debentures.

The London Electrical & General Trust reports a net revenue for the year ended June 30th of £28.789, as compared with £20,178 for 1935-36. General reserve receives £5.000, and the dividend for the year on the ordinary stock is 5¼ per cent. as against 10 per cent. for nine months, £5,924 (£3,915) is carried forward.

Bennis Combustion, Ltd.—Speaking at the ordinary general meeting on Monday, Mr. A. W. Bennis, chairman and managing director, stated that the company's order book for land trade showed more than twice the value that it did at the same time last year. Many more ships had been equipped with the Bennis system of marine stoking.

Rawlings Bros., Ltd., report a net profit of £12,127 for the year ended March 31st last. A dividend of 7½ per cent. plus a bonus dividend of 2½ per cent. is being paid on the ordinary shares, sums of £3.000 and £500 are placed respectively to reserve and to employés' benevolent and retirement account, and £4.204 is carried forward.

The Para Telephone Co., Ltd., reports a net profit of £2.989 for 1936, as against £1,786 for 1935. To this is added £1,118 from tax reserve, making £4,107. A sum of £3,011 goes to depreciation, leaving £3.011, of which £1,050 is taken for a 1½ per cent. dividend on the ordinary shares, £160 (£114) being carried forward.

Broom & Wade, Ltd., are paying a second interim dividend at the rate of 5 per cent. on the old ordinary shares. This payment is being made for the purpose of adjusting the distribution of the current year's profits between the holders of the old ordinary shares and those just issued to shareholders. The recent issue was oversubscribed.

W. & T. Avery, Ltd., report a net profit of £166,645 for the year ended March 31st, as compared with £149,601 in the preceding year, plus £62,392 brought in. The final ordinary dividend is 10 per cent., making 15 per cent. for the year (same), £45,000 is placed to reserve, £10,000 to pensions fund reserve, and £65,080 is carried forward.

Vickers, Ltd., are to pay interim dividends for the half-year ended June 30th of 2½ per cent. on the preferred 5 per cent. stock and the 5 per cent. preference stock, and 2½ per cent. tax free on the cumulative preference stock.

The Telegraph Construction and Maintenance Co., Ltd., is to pay an interim dividend of 5 per cent. on the ordinary shares. Last year the company resumed dividends, after five years, with a payment of 7½ per cent.

Rippingilles, Ltd., the registration of which appears in our "New Companies" section to-day, on Wednesday offered for sale 75,000 6 per cent. cumulative preference shares of 10s. each at par, and 180,000 ordinary shares of 5s. each at 9s. per share.

The International Telephone and Telegraph Corporation announces an agreement with Swiss bankers to underwrite $9,150,000 of about $30,000,000 of debentures of the United River Plate Telephone Co.—*Reuter* (New York).

The Anglo-American Telegraph Co. has announced interim dividends of 15s. per cent. on the ordinary and £1 10s. per cent. on the preferred ordinary for the quarter ended June 30th.

Venner Time Switches, Ltd.—Arrangements are being made to put on the market 108,000 ordinary stock units of 5s. each at a price between 26s. and 27s.

The County of London Electric Supply Co., Ltd., is maintaining the interim dividend on its ordinary capital at 3 per cent.

The Bournemouth and Poole Electricity Supply Co., Ltd., announces an interim dividend of 6 per cent. (same) on its ordinary stock.

The Richmond (Surrey) Electric Light and Power Co., Ltd., is to pay an interim dividend of 3 per cent. (same) on its ordinary shares.

The South London Electric Supply Co., Ltd., is paying an interim dividend of 3 per cent. on its ordinary shares.

The Metropolitan Electric Supply Co., Ltd., proposes to pay an interim dividend of 3 per cent. (same) on its ordinary shares. Holders of the new shares issued in June will receive £1 9s. 3.3d. per hundred shares.

Stocks and Shares

TUESDAY EVENING.

THERE is always something, Stock Exchange men half-humorously lament, to act as a disturbing factor in the course of their business. "If it is not one thing, it is another." At the moment, the extraordinary movements in the value of the franc are causing uncertainty and inculcating caution. To what lengths the fall in the value of the franc is to be allowed to proceed, nobody attempts to guess; but, obviously, steps must be taken to peg the exchange to something like a stable figure. Theoretically, a fall in the franc to any material extent should have the effect of raising the prices of metals and commodities, but the present condition of affairs in France is regarded as abnormal. The French people hold large amounts of gilt-edged British stocks and shares. Some of these were sold by holders who wanted to repatriate the money, in order to obtain the benefit of the greater number of francs which they can obtain against sterling. This may have been a contributory cause to the dullness which has lowered the price of the War Loan to a little under 100 and has affected, more or less, the values of gilt-edged stocks as a whole.

The Government and The Committee

The principal feature of interest this week, so far as electricity shares are concerned, is the issue of a report by the special committee of the Association of British Chambers of Commerce in answer to the Government's proposals for reorganisation of the electricity supply industry. The details are set out elsewhere, and from these it will be seen that the Association minces no words in its condemnation of the Government's suggestions. The Committee's report is, for a document of this kind, unusually constructive. It sets out the proposals which the Committee thinks should be substituted for those of the Government. Briefly put, the McGowan Report is taken as the basis for the conclusions of the Association of British Chambers of Commerce, which maintain that the amount of power proposed to be delegated to the Electricity Commissioners is more likely to cause than to remove difficulties.

Electricity Supply Shares

From the point of view of the market in electricity supply shares, this report is all to the good, although its conclusions were anticipated. As mentioned here last month, the market contention argued that there was little chance of the Govern-

ment's proposals becoming operative. Had these latter been less drastic, they might have stood a chance of favourable consideration; but in view of the manner in which the Government had gone far beyond the recommendations of the McGowan Committee, it was assumed that vaulting ambition had o'erleapt itself. Consequently, and after the first spasm of apprehension which brought down prices of electricity supply shares by a florin or half a crown, a calmer tone supervened. Prices were restored to nearer their previous levels, investment recovered its confidence, and quotations their stability.

Prices have held the improvement that they previously secured during the current month. County of London ordinary further advanced to 48s. 6d. and North-Eastern ordinary to 32s. 6d. North Metropolitans regained the deduction of the dividend.

London Passenger Transport

Prices of Central Electricity issues show no alteration and gilt-edged issues as a whole maintain their prices without much change. London Passenger Transport 4½ per cent. "A" stock is a point lower at 115½, but the "C" advanced 2 to 81. The Board and the main line railway companies are to proceed, according to a statement made in Parliament last week, with the schemes for the electrification and improvement of the suburban services out of Liverpool Street station. Recent articles in the Press, illustrating the miserable conditions that result from overcrowding on the trains during rush hours, have had the effect of drawing attention to the crying necessity for improvement in these directions. Suggestions, some rather startling in their novelty, are being ventilated for amelioration of conditions which, although New York may tolerate them, are certainly not appropriate to the capital of this country.

Passengers on some of the suburban services outside Liverpool station watch with daily interest the progress of the work which is now going on in connection with the electrification.

Cable and Wireless

The market in the new stocks of Cable and Wireless has reawakened into activity in consequence of the excellent figures presented by the traffic index number for June. That these were likely to prove satisfactory it had been expected, and the actual figures came up to the best anticipation, the index number being 73.5; highest for any June since 1930. "Bogey" is, of course, 100, the nearest approach to which of recent years was the 96.4 recorded last December, when the exceptional circumstances surrounding the Throne brought about a jump in the traffics of the cable companies. On the week the 5½ per cent. preference stock has risen 1½ points to 106, and the income stock is 1 to the good at 102. The ordinary stock is 5 points lower at 78½, on the theory that the two other issues are, by comparison, demonstrably cheaper, at all events for the time being.

The transatlantic companies are doubtless benefiting from the increased interest taken in American stocks and shares, activity in Wall Street being reflected in the American market in London. The Anglo-American Telegraph Company declared its usual quarterly dividends at the end of June, payable on the last day of the current month. The dividends are the same as before, 15s. per cent. on the ordinary stock and 30s. per cent. on the preferred ordinary. Both were quoted ex dividend on Monday in this week.

Brazilians and Argentines

Brazilian Tractions had a sharp rise to 26 owing, in part, to rumours of steps being taken which will assist the exchange-rate between the U.S.A. and Brazil. These rumours exercised an exhilarating effect upon the price of Brazil Tractions, which have again become a lively gambling counter. Amongst other dollar stocks, International Holdings, at 2⅞, show no change on the proposals now put forward for readjustment of capital. Argentine Tramways, and other Argentine Traction stocks, are dull in consequence of disappointment felt with the postponement by the Argentine Government of the scheme for co-ordinating the transport systems of Buenos Aires. It was thought the Argentine Government would be able to evolve some definite plan for publication either this month or next. Owing to the magnitude of the task, completion of any large-scale scheme, according to cabled information from Buenos Aires, is impossible until the end of this year.

Miscellaneous Matters

British Aluminium ordinary shares are 9d. higher, British Insulated 1s. 3d. and Johnson & Phillips 2s. 6d., there having been a steady demand for most of the shares in this section. General Electrics hardened to 81s. Enfield Rolling Mills are a trifle better at 18s. 3d. Difficulties in the way of securing raw materials are said to be encountered by some of the companies that use large quantities of steel and iron. The rubber share market is somnolent. New issues are securing a fair amount of popular support, but business throughout the House is of very retail order. The greatly regretted death of Marconi, which would have caused a slump in wireless shares had it happened ten years ago, was without effect this week. There is still a market, very small of course, in the shares of the old Marconi Wireless Telegraph Company, the great bulk of whose interest became merged in Cable & Wireless as from July, 1928.

Share List of Electrical Companies

	Nom.	Dividend. Previous.	Last.	Price July 20.	Rise or Fall.	Yield p.c. £ s. d.
HOME ELECTRICITY COMPANIES.						
Bournemouth and Poole	1	15	15	67/6	—	4 9 0
City of London	1	7½	7½	33/–	—	4 11 0
Clyde Valley	1	7	8	39/–	—	4 2 1
County of London	1	10½	10½	48/6	+6d.	4 6 6
Edmundson's 7% Pref.	1	7	7	33/6	—	4 3 7
Do. Ord.	1	8	9	40/–	—	4 10 0
Elec. Dis. Yorkshire	1	9	9	41/–xd.	—	4 7 10
Elec. Fin. and Securities	1	12½	12½	2⅛	—	4 13 0
Elec. Supply Corporation	1	11	12	52/–	—	4 12 8
Lancs Light and Power	1	7½	7½	33/6	—	4 [illegible] 7
Lond. Assoc. Electric	1	—	7	31/3	—	4 [illegible] 6
London Electric	1	7	8	35/6	—	4 10 2
London Power Deb. Red.	Stock	5	5	106½	—	4 14 0
Metropolitan	1	10	10	46/–	—	4 7 0
Midland Counties	1	7½	8	36/6	—	4 7 8
Mid. Elec. Power	1	8	9	2	—	4 16 0
North Eastern Electric Ordinary	1	6	7	32/6	+6d.	4 6 2
Do. 7% Pref.	1	7	7	34/6	—	4 1 2
Northampton	1	10	10	45/–	—	4 [illegible] 0
Notting Hill 6% Pref.	10	6	6	14	—	4 5 9
North Met. Elec. Ordinary	1	10	10	48/9xd.	+⅛	4 2 2
Do. do. 6% Pref.	1	6	6	30/6	—	3 18 8
Scottish Power	1	8	8	36/6	—	4 7 8
South London	1	7	7	32/–	—	4 7 6
Whitehall Elec. Invst. 7½% Pref.	1	7½	7½	23/–	+1/–	6 10 4
Yorkshire Elec.	1	8	8	39/–	—	4 2 1
PUBLIC BOARDS.						
Central Electricity, 1950–70	Stock	5	5	114	—	4 7 9
Do. 1955–75	,,	5	5	115½	—	4 6 7
Do. 1951–73	,,	4½	4½	109	—	4 2 7
Do. 1963–93	,,	—	3½	97½	—	3 11 10
London Elec. Trans. Gtd.	,,	—	2½	87½	—	2 17 1
London & Home Counties, 1955–75	,,	4½	4½	109	—	4 2 7
London Passenger Transport, A	,,	—	4½	115½	–1	3 18 3
Do. do. B	,,	—	5	117½	—	4 5 1
Do. do. C	,,	4	4	81	+2	4 18 9
West Midlands Joint Elec. 1948–68	,,	—	5	111½	—	4 9 8
TELEGRAPH AND TELEPHONE.						
American Tel. & Tel.	$160	9	9	170½	—	5 5 6
Anglo-Am. Tel. Pref.	Stock	6	6	123xd.	—	4 17 7
Do. Def.	,,	1½	1½	29½	—	5 1 8
Cable & Wireless 5½% Pref.	,,	4½	5½	106	+1½	5 3 9
Do. Ord.	,,	—	—	78½	–5	—
Do. Income	,,	—	—	102	+1	3 18 5
Globe Tel. & Tel. Ord.	10	4½*	5½*	15⅝	—	3 9 10
Do. do. Pref.	10	6	6	14½	+¼	4 5 9
Great Northern Tel.	10	20	20	41	–½	4 17 5
Marconi-Marine	1	10	7½	1⅜	—	4 5 9
Oriental Telephone Ord.	1	12*	12*	3⅛	—	3 16 10
HOME AND FOREIGN TRAMS, ETC.						
Anglo-Arg. Trams First Pref.	5	Nil	Nil	5/–	—	—
Do. do. 2nd Pref.	5	Nil	Nil	3/9	—	—
Do. do. 5% Deb.	Stock	Nil	Nil	21½	—	—
British Electric Traction Def. Ord.	,,	5	5	1250	–25	—
Do. do. Pref. Ord.	,,	8	8	165	—	4 15 5
Brazil Traction	$100	40 cts.	50 cts.	26	+1⅛	—
Brit. Columbia Elec. Rly. Pfd.	Stock	5	5	105½	—	4 14 9
Mexican Light Common	$100	Nil	Nil	2	—	—
Do. 1st Bonds	$500	5	5	44½	—	—
Victoria Falls Ord.	1	20	12	62/6	—	3 17 0
West Riding	1	6½	10	43/9	–⅛	4 11 4
MANUFACTURING COMPANIES.						
Aron Electricity Ord.	1	15	15	2½	—	6 0 0
Assoc. Elec. Ord.	1	8	10	48/–	—	4 3 4
Do. Pref.	1	8	8	37/6	—	4 5 3
Babcock & Wilcox	1	8	10	48/9	—	4 2 0
British Aluminium Ord.	1	7½	10	51/3	+9d.	3 18 3
British Insulated Ord.	Stock	20	20	4⅛	+⅛	4 1 2
Brush Ord.	Stock	Nil	Nil	40½	—	—
Callender's	1	15	15	4⅛	—	3 2 3
Do. 6½% Pref.	1	6½	6½	30/–	—	4 6 8
Crompton Parkinson Ord.	5/–	12½	12½	57/6	—	—
Do. 8% Pref.	1	8	8	37/6	—	4 5 4
Electric Construction	1	7	10	37/6	—	5 6 8
Enfield Cable Ord.	1	25	25	5⅛	—	4 8 0
English Electric	1	Nil	Nil	33/–	—	—
Do. do. Pref.	1	6½	6½	26/–	—	5 8 4
Ericsson Tel.	5/–	20	25	2⅜	—	2 12 8
Ever Ready	5/–	35	45	33/6	—	6 12 6
Ferranti Pref.	1	7	7	27/6	—	5 1 10
G.E.C. Pref.	1	6½	6½	32/6	—	4 0 0
Do. Ord.	1	15	17½	81/–	+1/–	4 7 6
Henley's	5/–	30	15	19/3	—	3 17 10
Do. 4½% Pref.	1	4½	4½	1⅛	—	4 0 0
India-Rubber Pref.	1	5½	5½	22/6	—	4 17 9
Johnson & Phillips	1	7½	10	43/9	+⅛	4 11 4
Lancashire Dynamo	1	10	20	3¾	—	5 18 4
Siemens Ord.	1	6	7½	32/6	—	4 12 4
Telegraph Construction	£1	Nil	7½	2⅝	—	3 8 8

* Dividends are paid free of Income Tax.

Published Specifications

Compiled expressly for this journal by a firm of chartered patent agents. The numbers in parentheses are those under which the specifications will be printed and abridged and all subsequent proceedings will be taken.

1935

19421. "Circuit controlling devices." C. J. Evans and S. C. Evans. July 8th, 1936. (467764.)

23981. "Positive electrode for galvanic cells." Pertrix Chemische Fabrik A.G. August 15th, 1935. (467828.)

26308. "Methods of vibrating objects electromagnetically and vibrator apparatus therefor." Central Electric Tool Co. October 13th, 1934. (467813.)

26624. "Mercurial electrical cut-outs." F. T. Jenkins. October 16th, 1935. (467660.)

32121. "Direction-finding radio receiving systems." Marconi's Wireless Telegraph Co., Ltd., and G. M. Wright. November 20th, 1935. (467892.)

32231. "Wireless and like receivers." W. S. Percival November 20th, 1935. (467667.)

32249. "Automatic circuit-breaking-devices for electrically heated vessels." A. E. Willis. November 21st, 1935. (Cognate application 26144/36.) (467668.)

34194. "Electric discharge lamps." General Electric Co., Ltd. (Patent Treuhand-Ges. für Elektrische Gluhlampen). December 10th, 1935. (Cognate application 4271/36.) (467820.)

35205. "Electrical precipitation of suspended particles from gases." Whessoe Foundry & Engineering Co., Ltd., A. G. Grant and A. Puttick. December 19th, 1935. (467823.)

35335. "Electric shaft furnaces." Oesterreichisch Amerikanische Magnesit Akt.-Ges. December 21st, 1934. (467898.)

35456. "Electrically controlled signalling installations for railway block sections with single track sections." Vereinigte Eisenbahn-Signalwerke Ges. January 17th, 1935. (468034.)

35492. "Electrical heaters of permanent hair waving or curling apparatus." T. H. Robinson, C. D. Barlow and W. H. Watson (trading as Salon Electrical Co.). December 23rd, 1935. (467977.)

35513. "Electrolytic condensers." Ferranti, Ltd., and M. V. Pirie. December 23rd, 1935. (467978.)

35520. "Plug-and-socket connectors for electric circuits." A. Reyrolle & Co., Ltd., and F. C. Fuke. December 23rd, 1935. (467827.)

35588. "Thermionic amplifiers." Standard Telephones & Cables, Ltd., and E. K. Sandeman. December 23rd, 1935. (467833.)

35627. "Mosaic electrodes for use, for example, in cathode-ray tubes." Marconi's Wireless Telegraph Co., Ltd. December 21st, 1934. (467838.)

35635. "Magnetron circuit arrangements." Telefunken Ges. für Drahtlose Telegraphie. December 22nd, 1934. (467840.)

35661. "Electrolytic condensers." Naamlooze Vennootschap Philips' Gloeilampenfabrieken. January 25th, 1935. (468036.)

35772. "Electron-discharge devices and circuits therefor." Marconi's Wireless Telegraph Co., Ltd. December 27th, 1934. (467915.)

35781. "Rectifier for television reception." Radioakt.-Ges. D. S. Loewe. January 2nd, 1935. (467916.)

35817. "Circuit arrangement for telephone transmission lines." A. E. G. Stranden. December 27th, 1935. (467987.)

35827. "Electrodynamic apparatus." E. Hausdorf. November 4th, 1935. (467990.)

35865. "Television and like reproducing apparatus." Marconi's Wireless Telegraph Co., Ltd., and N. Levin. December 27th, 1935. (467995.)

35866. "Carrier-wave modulator arrangements." Marconi's Wireless Telegraph Co., Ltd., and C. S. Cockerell. December 27th, 1935. (467996.)

35867. "Television reproducing apparatus." Marconi's Wireless Telegraph Co., Ltd., and G. M. Wright. December 27th, 1935. (467918.)

35868. "Echo-sounding apparatus." Marconi's Wireless Telegraph Co., Ltd., and G. M. Wright. December 27th, 1935. (467997.)

35885. "Electric summating apparatus." J. G. Rutherford and T. R. Warren. December 28th, 1935. (468040.)

1936

208. "Enclosed switchgear for use in cooker control and similar circuits." General Electric Co., Ltd., A. F. Searle and G. E. Taylor. January 2nd, 1936. (467740.)

380. "Electromagnetically-operated valves." J. L. Musgrave and R. Crittall & Co., Ltd. January 4th, 1936. (467923.)

842. "Electric conduit fittings." Fitter & Poulton, Ltd., and J. Poulton. January 10th, 1936. (467677.)

1261. "Stepwise moving electrical devices." Kabushiki Kaisha Hokushin Denki Seisakusho. January 16th, 1935. (467846.)

1796. "Electric fusible cut-outs." C. H. G. Burrell and F. E. Unne. January 20th, 1936. (467683.)

1929. "Electric fuses." W. T. Henley's Telegraph Works Co., Ltd., and H. C. Hoban. January 21st, 1936. (467684.)

3303. "Electrical socket-couplings and switch-socket-combinations." J. A. Crabtree & Co., Ltd., and H. F. McLoughlin. February 4th, 1936. (467743.)

3894. "Electric circuit-breakers." Allmänna Svenska Elektriska Aktiebolaget. February 8th, 1935. (467746.)

4880. "Electrical protective devices." Siemens Bros. & Co., Ltd., and W. E. Goodwin. February 18th, 1936. (467860.)

7991. "Electric discharge lamps." General Electric Co., Ltd. (Patent Treuhand-Ges. für Elektrische Gluhlampen). March 17th, 1936. (467692.)

9140. "Mains-supply apparatus for wireless receivers, e.g., television receivers." Radioakt-Ges. D. S. Loewe. March 29th, 1935. (467865.)

9289. "Electric plug-and-socket connections." R. Bain and N. Allday. March 28th, 1936. (467936.)

9380. "Metal-clad oil-filled electric switchgear." General Electric Co., Ltd., H. J. Coates, and C. C. Garrard. April 3rd, 1936. (467937.)

10957. "Transformer voltage regulating systems." British Thomson-Houston Co., Ltd. April 16th, 1935. (Addition to 400962.) (467866.)

11746. "Storage battery plate constructions." Owens-Illinois Glass Co. April 25th, 1935. (467696.)

11933. "Telephone and like signalling systems." Standard Telephones & Cables, Ltd. April 27th, 1935. (467867.)

12333. "Ring-shaped reflector element for improving the luminosity of electric lamps." A. Gunsbourg. April 30th, 1936. (467941.)

13366. "Electrical circuit arrangements embodying automatic gain control means." Telefunken Ges. für Drahtlose Telegraphie. May 9th, 1935. (468008.)

13630. "Electric power systems." Westinghouse Electric & Manufacturing Co. June 15th, 1935. (467763.)

14570. "Electric regulating systems." British Thomson-Houston Co., Ltd. May 22nd, 1935. (467872.)

16908. "Electron valves." Naamlooze Vennootschap Machinerieen en Apparaten Fabrieken Meaf. June 20th, 1935. (467703.)

18402. "Electric gas-blast switches." British Thomson-Houston Co., Ltd. July 2nd, 1935. (468012.)

20053. "Machines for the manufacture of electric incandescent lamps." General Electric Co., Ltd. July 19th, 1935. (467876.)

23356. "Electro-filters." A. F. Meyerhofer and E. A. Meyerhofer (trading as Meyerhofer & Co.). December 21st, 1935. (468019.)

23770. "Electrical systems for the photographic recording of electric oscillations and/or for sound-recording." O. K. Kolb (P. F. Beer). August 31st, 1936. (467,711.)

25424. "Electrically operated reciprocating pumps." P. Poirson. September 14th, 1935. (468,020.)

24650. "Automatic emergency lighting set for use in connection with electric-light mains." P. A. Griffiths. September 10th, 1936. (468,022.)

25509. "Method and apparatus for electric heat-treatment of gears and other articles." F. S. Denneen and W.C. Dunn. September 19th, 1936. (467,882.)

26962. "Automatic frequency control of high-frequency electric circuits." Hazeltine Corporation. October 24th, 1935. (Cognate application, 26963/36.) (467,717.)

27329. "Electric motor control." Igranic Electric Co., Ltd. October 12th, 1935. (467,782.)

28429. "Direction-finding radio receiver systems." Telefunken Ges. für Drahtlose Telegraphie. October 19th, 1935. (467,785.)

29354. "Electric transformers." Steatit-Magnesia Akt.-Ges. November 27th, 1935. (467,786.)

30514. "Electric discharge vessels made of ceramic material and process for the production thereof." J. T. Shevlin (Siemens & Halske Akt.-Ges.). November 9th, 1936. (467,720.)

30531. "Electric discharge devices." British Thomson-Houston Co., Ltd. November 8th, 1935. (467,885.)

30796. "Machines for electric welding." L. Renault. January 17th, 1936. (467,721.)

31805. "Piezo-electric crystal apparatus." Standard Telephones & Cables, Ltd. (Western Electric Co., Inc.). November 20th, 1936. (467,724.)

33164. "Electrolytic deposition of metals." Kodak, Ltd. December 17th, 1935. (467,797.)

34285. "Methods of capping vitreous vessels, such as electric incandescent lamps, without the use of cement." General Electric Co., Ltd. (Patent Treuhand-Ges. für Elektrisch Gluhlampen). December 14th, 1936. (467,956.)

34853. "Cathode-ray sweep circuits, particularly for television scanning." Standard Telephones & Cables, Ltd. February 25th, 1936. (467,958.)

1937

842. "Alternating-current generator arrangements for arc-welding purposes." Siemens-Schuckertwerke Akt.-Ges. February 23rd, 1935. (Divided out of 5549/36.) (467,960.)

2532. "Electric condensers." Allmänna Svenska Elektriska Aktiebolaget. July 30th, 1936. (467,804.)

3207. "Alternating-current dynamo-electric machines." British Thomson-Houston Co., Ltd. February 4th, 1936. (467,963.)

3331. "Pneumatically actuated electric switches." British Thomson-Houston Co., Ltd. February 4th, 1936. (467,964.)

5265. "Electric switches with arc-extinguishing means." British Thomson-Houston Co., Ltd. February 21st, 1936. (467,809.)

8179. "Electrical follow-up system, particularly for use in the automatic steering of ships." Sperry Gyroscope Co., Inc. September 19th, 1934. (Divided out of 25987/35.) (467,966.)

9279. "Containers for galvanic batteries." Chloride Electrical Storage Co., Ltd. May 18th, 1936. (467,811.)

11882. "Methods of vibrating objects electromagnetically and vibrating apparatus therefor." A. H. Stevens (Central Electric Tool Co.). September 23rd. 1935. (Divided out of 467,813.) (467,890.)

Trade Mark Applications

The following are among the recent applications for British trade marks. Objections against any of the proposed marks may be entered within one month from July 14th :—

Autelco. No. 574402. Class 8. Telephonic, telegraphic, signalling, radio-telegraph and radio-telephone signalling instruments and parts thereof.—Automotive Electric Co., Chicago (British representatives : Dicker, Pollak, Mercer, Tench and Meyer, 20-23, Holborn, E.C.1).

Gnome. No. 573541. Class 13. Electric lamps (ordinary).—Gnome Electric Lamp Works, Ltd., 70a, Basinghall Street, E.C.2.

Crompton. No. 577119. Class 13. Electric lamps (ordinary).—Crompton Parkinson, Ltd., Netherfield Road, Guiseley, Leeds.

Rolamatic. No. 573364. Class 18. Electric ovens and toasting and roasting stoves.—British Rola Co., Ltd., 69, Minerva Road, Park Royal, N.W.10.

New Work for Contractors

Particulars of new works and building schemes for the use of electrical installation contractors and traders

Publication in this list is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Acton.—Factory, Chase Road; R. H. Radburn, 60a, High Street, London, W.3. Extension to factory, Western Avenue; Nordac, Ltd., Reno Works, Rosslyn Crescent, Wealdstone.

Ardrossan.—Houses, Parkhouse and Whitlees (electrical work); Black & Shapley, architects, 15, Barr Street, Ardrossan.

Barnsley.—Houses (84), Worsborough Common (£24,998); borough engineer.

Bewdley.—Houses (60), Bark Hill; S. J. Rowe, borough surveyor, Municipal Offices.

Bingley.—Houses (140), Fern Cliffe estate; E. O. Robinson, architect.

Birmingham.—Schools, Wheeler's Lane, King's Heath (£58,475), Cockshut Hill, Sheldon (£34,500), and Whittington Oval, Yardsley (£35,500), for E.C.; education architect. Additions to the Woodlands Home, Northfield, for the Royal Cripples Hospital (£40,000), with electrical work; R. Fenwick, Ltd., builders, William Edward Street, Birmingham.

Blackheath (STAFFORDSHIRE).—Cinema, near High Street, for the Midland Cinema Co.; J. M. Tate & Son, builders, Cradley Heath.

Bollington.—Houses (62), Henshall Road; H. Bamford.

Bridgwater.—Houses (66), various parishes; L. S. Clatworthy, architect, R.D.C. Offices, Weston Zoyland Road.

Bristol.—Houses (24), Long Ashton estate; Maynard Froud and Stevens, chartered surveyors, St. Stephen's Chambers, Baldwin Street.

Bromsgrove.—Houses (74), Coombes Park estate; Belle View Estate Co.

Burton-on-Trent.—Electricity service centre (£25,000), for E.C.; borough surveyor.

Cheadle.—Houses (60), near Pendlebury Road, Gatley, for J. Coonan, 150, Hempshaw Lane.

Cheltenham.—School, Whaddon estate (£13,535); S. C. Morris & Sons, Ltd.

Chester-le-Street.—Houses (63), by direct labour; M. Wilson, R.D.C. surveyor.

Chipping Norton.—Houses (20), Churchill Road site; borough surveyor, Burford Road.

Cranfield.—Cinema for J. Moss, proprietor of Wolverton Cinema.

Doncaster.—Houses (102), Wheatley Park; borough engineer, 2, Priory Place, Doncaster. Cinema at the junction of Beckett Road and Canterbury Road, for Metcalfe Bros.

Dukinfield.—Houses, Stanley Fields, for the Housing Committee; E. N. Stannion, borough surveyor.

Durham.—Houses, Blackgate, Bearpark, Croxdale, Sherburn Hill, Cassop and Shadforth; R.D.C. surveyor.

Edinburgh.—Houses (24), Stevenson Grove; T. L. Rae, builder, 17, York Place, Edinburgh. 1. Cinema, Church Hill (£25,000); W. J. Henry, builder, 63, Abbeyhill, Edinburgh. Offices for the Eagle Star Insurance Co., George Street; P. Marwick & Son, architects, 54, Northumberland Street.

Ellesmere.—Houses (38), Oswestry Road; Griffiths Bros., builders, Ellesmere.

Ely (CAMBRIDGESHIRE).—Houses (40), five sites; R.D.C. surveyor.

Emley.—Houses (22); P. Rhodes, Ltd., builders, Cardigan Road, Leeds.

Eston.—Houses (203), Cross Beck; C. W. Bell.

Exeter.—Civic centre buildings; Bradshaw, Gass and Hope, architects.

Felling-on-Tyne.—Houses (40); International Paint and Compositions, Ltd., promoters, Felling-on-Tyne.

Gateshead-on-Tyne.—Houses (116), Old Fold; borough engineer. Factory (90,000 square feet), for Hunters, Ltd., Team Valley estate; Corking and Fennell, architects, 16, West Street.

Gillingham.—Extensions to Napier Road school (£30,295); T. Cornelius & Son, builders, Gillingham.

Glasgow.—Reconstruction of Olympia Theatre, Orr Street; C .J. McNair and Elder, architects, 272, St. Vincent Street.

Golborne.—Houses (38), Sandy Lane, Lowton, for B. Davey.

Great Yarmouth.—Houses (60), three sites; borough engineer.

Harpenden.—Public hall (£19,600); R.D.C. surveyor.

Hebburn-on-Tyne.—Houses (350), for the North-Eastern Housing Association, Northumberland Road, Newcastle-on-Tyne; Page, Son and Bradbury, 67, King Street, South Shields. School (£48,000), Clegwell site, for E.C.; D. Glen, builder, Back Queen's Road, Jarrow-on-Tyne.

Hetton (Co. DURHAM).—Houses (70), High Downs and Springwell Terrace; A. H. Fennell, architect, Bridge End Chambers, Chester-le-Street.

Hillingdon.—Cinema, for D. Mistlin; L. and W. Whitehead, Ltd., builders, Clapham Road, London, S.W.9.

Holland (LINCS).—Extensions and alterations to Spalding Grammar school (£28,344), for E.C.; county architect, County Hall, Boston.

Hornchurch.—Houses (40), Ingrebourne Road, Rainham; D. E. Hart, U.D.C. surveyor, Council Offices, Billett Lane, Hornchurch.

Hyde.—Development of Shaw Hall estate, Newton; G. Clayton. Extensions to works, Boardman Street; Bury & Hopwood.

Inverness.—Houses (100), South Kessock Farm (£45,628); T. O'Bierne, burgh surveyor, Council Chambers, Inverness.

Irish Free State.—(DUBLIN).—Houses (309), Terenure site (£136,672); G. & J. Crampton, builders. Factory, for the General Estates & Trust Co., Ltd. Factory, for P. Kavanagh & Sons. (WEXFORD).—Town hall (£18,703); E. & W. Dempsey, builders, Dublin.

Kettering.—Houses, Corby; H. R. Surridge, of Gotch, Saunders and Surridge, architects, High Street.

King's Lynn.—Houses (139), Gaywood Hall estate; borough surveyor.

Kingswood.—Houses (52), Grimsbury Road, Warmley Hill; U.D.C. surveyor.

Lincoln.—Houses (166), St. Giles' estate; city surveyor.

London.—(SOUTHWARK).—Tenements, Tabard estate (£36,543); Stewart & Partners, Ltd., 105, Baker Street, W.1.

Middlesbrough.—Houses, Park Road South, for the owners of the Middlesbrough Estates, Ltd.; F. Jackson, staff architect, Queen's Square. Factory, Longlands Road, for Donaldsons, Ltd.; Kitching & Co., architects, 21, Albert Road.

Middlesex.—School, Wilmer Way, Southgate (£42,764), for C.C.; director of education, 10, Great George Street, London, S.W.1.

Morpeth.—Houses, Alexandra Road and West End; G. Towers & Son, builders, 77, Union Street, Blyth.

Nantgarw (CARDIFF).—Two factories. Treforest trading estate, for the South Wales and Monmouthshire Trading Estates, Ltd.; secretary, Western Mail Chambers, Cardiff.

Newcastle-on-Tyne.—Business premises for Messrs. Hindhaughs; Marshall & Tweedy, architects, 129, Pilgrim Street. Child welfare centre, Brinkburn Street; city architect.

Newport (SHROPSHIRE).—Houses (22), Broomfield Road; B. Byram, architect, Central Chambers, Market Square, Wellington.

New Whittington.—Houses (37), High Street, &c. (£15,045), for Chesterfield T.C.; A. Heath, builder, Chesterfield.

Northern Ireland.—(MAGHERAFELT).—Alterations and additions to Technical school, for E.C.; R. T. M'Guckin, architect, Garden Street.

Nottingham.—School, Cavendish Road, Carlton (£36,450), for C.C.; county architect, Shire Hall, Nottingham.

Oldham.—Houses (34), Primrose Bank; J. Ashurst, borough surveyor, Municipal Buildings, 75, Union Street.

Pontefract.—Houses (24), Monkhill Lane; W. A. Holmes.

Pwllheli.—Houses (60), Morfa Garreg; Glynne Jones, architect.

Reading.—Alterations and additions to Station Buildings, for the G.W.R.; chief engineer, Paddington Station, London.

Redcar.—Bus station, High Street; United Automobile Services, Ltd.

Ryton-on-Tyne.—Houses, Crookhill (£32,880); R. Carse & Sons, builders, Amble.

St. Helens.—Extension to the Municipal and Police buildings; A. P. Statham, borough engineer.

Sawbridgeworth.—Houses (30), Bull Fields; R.D.C. surveyor.

Seaham.—Houses (61), Henry Street and Dawdon Crescent; J. B. Abbey, U.D.C. surveyor, Dalton House, Tennest Place.

Sedgley.—Houses (90), Lower Gornal estate; U.D.C. surveyor.

Sheffield.—Houses, Far View, Swanbourne Road, and Norton estate; M. J. Gleeson, Ltd., 822, Chesterfield Road, Woodseats. Cinema at the junction of Stainforth Road and Attercliffe Road, for H. & A. Cooper and G. L. Howlden, Telegraph Buildings. Maternity block, Lodge Moor Hospital (£21,603); borough surveyor.

Southgate.—Houses (76), Chaseville Park Road; New Ideal Homesteads, Ltd. Extensions to Town Hall (£31,396); Tarran Industries, Ltd., 15, Dartmouth Street, London, S.W.1.

Stocksbridge.—Houses (22), the Royd, Deepcar; D. E. Robinson, U.D.C. surveyor, Town Hall, Stocksbridge, near Sheffield.

Stockton-on-Tees.—Extensive alterations to Central Buildings for Sams, Ltd., Newport Road, Middlesbrough. Rebuilding after fire of the Cinema, High Street; W. Pearson & Sons, builders, Stranton, West Hartlepool.

Stoke-on-Trent.—Pottery factory, Barlaston, for Josiah Wedgwood & Sons, Ltd.; Keith Murray and C. S. White, architects, 19, Russell Square, London, W.C.1.

Sunderland.—Houses (244), Ebdons Farm estate; Lane, Fox & Co., Ltd., builders, Thirlmere estate. Houses (22), Ranson Street; G. T. Brown & Sons, architects, 51, Fawcett Street. Additions to Technical College (£47,000), for E.C.; Randle & Co., builders, Sunderland.

Swansea.—Cinema for the Bernstein Theatres, Ltd., 36, Golden Square, London, W.1.

Swindon.—Houses (20), Bessemer Road; Colborne's Estates, Ltd.

Thirsoe.—Houses (22), various sites; Hunt & Coates, architects, 51a, Abbeygate Street, Bury St. Edmund's.

Uxbridge.—Houses (100), Milton Court estate, Ickenham; Dunster, Richardson & Co. Factory, Moorhall Road, Harefield; Peerless Wire Fence Co., Ltd., Oldfield Lane, Greenford. Cinema, High Street for Odeon Theatres, Ltd.; G. H. Denne & Son, Ltd., builders, 42, Theobalds Road, London, W.C.1.

Walsall.—Factory, Caldmore Road, for C. Haywood, Ltd.; C. Gray, architect, 15, Bridge Street.

Watchet.—Cinema, Esplanade; T. B. Peel, Bus station, Watchet.

Wells (NORFOLK).—Houses (20), Northfield estate; T. Inglis Goldie, architect, Wells.

Wetherby.—Houses (28), four sites; Pennington, Hustler & Taylor, architects, Ropergate, Pontefract.

Weymouth.—Premises (£30,000), for F. W. Woolworth & Co., Ltd.

Whitby.—Houses (40), Castle Park; R. A. Wilson & Sons, builders, Springhill. Additions to laundry premises, Stakesley Road, for Thornton & Co.; A. E. Young, architect, Mayfield Road.

Whittlesey.—Houses (38), Eastrea Road; U.D.C. surveyor, Council Offices, 6, Delph Street.

Wigan.—Business premises, Standishgate and Hope Street, for the British Home Stores, Ltd.

Wombwell.—Two-storey building, High Street, for M. Burton, Ltd., Hudson Road, Leeds; N. Martin, staff architect.

Worcester.—Odeon Cinema, fronting on Foregate Street; H. W. Weedon, architect, 84, Colmore Row, Birmingham.

Worksop.—Houses (285), Raines Avenue; F. B. Flint, builder, Raines Avenue.

Worthing.—Beach House development scheme (£30,000); borough surveyor.

Yorkshire.—School, Queensbury (£42,432), for West Riding E.C.; county architect, Wakefield.